Sound Transit Sounder Yard Expansion Project

SEPA Environmental Checklist

November 2013

Prepared for:

401 South Jackson Street
Seattle, Washington 98104

Prepared by:

PARSONS BRINCKERHOFF

999 Third Avenue, Suite 3200
Seattle, Washington 98104

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Environmental Checklist

A. Background

1. Name of the proposed project

Sounder Yard Expansion Project

2. Name of Applicant

Sound Transit

3. Address and telephone number of applicant and contact person

Lauren Swift, Environmental Planner
Sound Transit
401 South Jackson Street
Seattle, WA 98104-2826
(206) 398-5302
lauren.swift@soundtransit.org

4. Date checklist prepared

November 2013

5. Agency requesting checklist

Sound Transit is the lead agency under the State Environmental Policy Act (SEPA).

6. Proposed timing or schedule (including phasing, if applicable)

Environmental review and preliminary design are anticipated to be complete in summer of this year. Final design would occur between fall 2013 and summer 2014. Construction is proposed to begin in summer 2015 and is expected to be completed by fall 2016.

7. Plans for future additions, expansions, or further activity related to or connected with this proposal

In addition to the proposed project (which includes a third storage/layover track and additional parking), Sound Transit is also considering construction and operation of a maintenance facility and additional yard tracks at this location, although a determination to proceed with these potential future improvements has not been made at this time. Environmental information that has been prepared, or will be prepared, directly related to this project

Cursory Hazardous Materials Evaluation Sounder Yard and Shop Sites (GeoEngineers, 2011b)—Available upon request

Preliminary Geotechnical Services Sounder Yard & Shop Facilities King and Pierce Counties Report (GeoEngineers, 2011b)—Available upon request

List of Fisheries Threatened and Endangered Species (Herrera Environmental, 2013)—Attachment A to this Environmental Checklist

*Cultural Resources Assessment for the Sounder Yard Expansion Project (*Historical Research Associates, Inc. 2013)—Attachment B to this Environmental Checklist

Sounder Yard Expansion Noise and Vibration Technical Report (Parsons Brinckerhoff, 2013)—Attachment C to this Environmental Checklist

8. Applications that are pending for governmental approvals or other proposals directly affecting the property covered by the proposal

There are no pending government approvals or proposals.

9. List of governmental approvals or permits that will be needed for the proposal

National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit—Washington State Department of Ecology

Building or Site Development Permit—City of Lakewood

Clearing and Grubbing Permit—City of Lakewood

10. Brief, complete description of the proposal, including the proposed uses and the size of the project and site

Sound Transit is proposing to add a third track for train storage at the existing Lakewood Yard. The Lakewood Yard site is on property owned by Sound Transit between 100th Street SW and Steilacoom Boulevard SW, and is approximately 21.59 acres. Currently five, seven-car train sets are stored at the yard. The new layover track would provide the capacity to accommodate storage of seven, eight-car train sets with standby power outlets on the site. Crew administration facility trailer(s) would be added along the east side of the new track along with up to 45 automobile parking spaces and would replace and provide more staff capacity than the existing crew administration facility currently located west of the Lakewood Yard site. The existing crew administration facility employs an estimated 20 staff, depending on need. Observations of exiting parking indicate that the existing crew administration facility provides up to 25 parking spaces.

The existing yard roadways, site lighting, security system, and drainage facilities would be updated as described below. Key project elements are shown in Figure 1.

Key Project Elements

- Third layover/storage track and turnouts at each end of the layover yard
- Trailer(s) with approximately 3,200 square feet of space for crew administration
- Concrete pad foundation for trailer(s)
- Up to 45 automobile parking spaces
- Retaining walls where required
- Air lines and air compressor building
- Standby power along tracks
- New access road along the east side of the new storage tracks
- Sewage dump station
- Site lighting for access road and parking area
- Filling of the existing water quality/infiltration ditches to provide appropriate track bedding for new tracks and replacing drainage function with new water quality/infiltration ditches east of the proposed access road
- Paving the remainder of the existing Center Access Road and existing East Access Road

Sound Transit would also conduct geotechnical explorations within the right of way to support design and engineering activities. Soil explorations would consist of test pit holes approximately 5 feet to 10 feet depth for infiltration testing. At least four test pits would occur along the length of the third track, with the addition of one at proposed parking lot and one at proposed crew administration facility site.

11. Location of the proposal, including street address, if any, and section, township, and range; legal description; site plan; vicinity map; and topographical map, if reasonably available

The Lakewood Yard site is located west of Lakeview Avenue SW, between 100th Street SW and Steilacoom Boulevard SW, in the City of Lakewood, Washington in Pierce County (Figure 2). The site is located in Range 02E, Township 19N, Section 01. The property is Pierce County Assessor tax parcel numbers 0219011133 (portion) and 0220364108.

B. Environmental Elements

1. Earth

a. General description of the site (underline)

Flat, rolling, hilly, steep slopes, mountainous, other

The project site is relatively flat with a gradient of less than 0.5.

b. What is the steepest slope on the site (approximate percent slope)?

Although the project site is generally flat, it contains limited areas of slopes in the range of up to 30 percent. The 30 percent slopes are located outside of the project footprint and limits of construction.

c. What general types of soils are found on the site (for example clay, sand, gravel, peat, muck)? Specify the classification of agricultural soils and note any prime farmland.

The project site is located on filled land overlaying glacial drift referred to locally as Steilacoom Gravel. The glacial drift consists of loose-to-dense fine-to-coarse gravel with varying sand, cobble, and boulder content as well as localized sand layers.

d. Are there any surface indications or a history of unstable soils in the immediate vicinity? If so, describe.

Based on geologic mapping and the available subsurface information of the Lakewood Yard, it does not appear that the site is underlain by liquefiable soils. The project site is not located in known fault areas; therefore, the risk of fault rupture is considered to be low. There are also no significant slopes on the project site; therefore, the risk of seismically inducted landsliding is considered to be low (GeoEngineers, 2011b).

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate the source of the fill.

The project would require the placement of approximately 4,500 cubic yards of fill material that is necessary to provide appropriate bedding for the third layover/storage track over the water quality/infiltration ditches. The type of fill would be specified in construction bid documents and would be pervious, thereby allowing precipitation to infiltrate or sheet flow off the track alignment to a new infiltration trench parallel to the proposed paved access road on the east side of the new layover/storage tracks.

f. Could erosion occur as a result of clearing, construction, or use?

Due to the flat nature of the project site in the areas that will be cleared, and the highly infiltrative nature of the on-site soils, erosion, if any, would be minimal.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example buildings or asphalt)?

The project site would be approximately 15 percent impervious surface after construction. The impervious surface would consist of approximately 142,800 square feet (3.28 acres) of concrete pavement in the form of paved access roads, foundation for the crew administration facility trailer(s), and parking.

h. Describe the proposed measures to reduce or control erosion or other impacts to the earth, if any.

The following best management practices (BMPs) would be used to reduce or control erosion and sediment impacts during construction to the extent possible:

- Construction BMPs, such as the use of stabilized construction entrances, silt fencing, sediment traps, application of seeding or mulching for soil stabilization, or other techniques, would be incorporated as necessary in accordance with the requirements of the NPDES permit for construction.
- The areal extent of exposed soil would be minimized at any given time. All unstable slopes with the potential to impact fish-bearing waters would be stabilized.
- A Temporary Erosion and Sediment Control Plan would be prepared prior to construction to identify standard erosion and sediment control procedures.

2. Air

a. What types of emissions to the air would result from the proposal (e.g., dust, automobile, odors, industrial, wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.

The proposed project is likely to generate a minor increase in air emissions but contribute to the long-term trend of incremental regional reductions in emissions as described below.

The air pollutants that could be present are particulates from construction and possibly carbon monoxide from any localized changes in roadway traffic conditions. The proposed project would not provide additional train service, only train storage. Therefore, no additional air emissions would occur from train service.

Project construction would result in temporary impacts from fugitive dust and emissions from construction equipment and vehicles. On-site equipment would include heavy trucks, excavators, pavers, and compressors for demolition, grading, and construction. Emissions from construction are not expected to significantly degrade local air quality.

The proposed project includes crew administration facility trailer(s), parking for up to 45 automobiles would likely result in a minor increase in air emissions. Base on the existing operation, which employs approximately 20 staff, added traffic from 15-20new trips at the beginning and end of a typical work day (or 30 to 40 daily trips) generated by additional staff that would be located on the site would not increase congestion related air emissions in the area surrounding the site.

Overall, the Sounder commuter rail service promotes the use of transit, which can result in regional reductions in automobile traffic and carbon monoxide emissions. Increased use of Sounder would contribute to a travel mode shift from private automobile trips resulting in a reduction of greenhouse gas emissions.

The proposed project is exempt under air quality conformity requirements based on Washington Administrative Code 173-420-110(2)(k) and 40 Code of Federal Regulations (CFR) 93.126, Exempt Projects, "Construction of new vehicle storage and maintenance facilities." The exempt status of the proposed improvements was confirmed by Kelly McGourty, Air Quality Project Manager at the Puget Sound Regional Council (PSRC), who is the regional expert on air quality conformity (McGourty, 2011).

b. Are there any off-site sources of emissions or odors that may affect your proposal? If so, generally describe.

Emissions from new vehicle trips to and from the site are discussed in Section 1a. There are no off-site sources of emissions or odors that would affect the proposal.

c. Describe proposed measures to reduce or control emissions or other impacts to air, if any.

The construction contractor will be required to comply with all relevant federal, state, and local air quality laws, including the requirements of the Puget Sound Clean Air Agency.

Appropriate BMPs would be employed to reduce surface and air movement of dust during grading, demolition, and construction. Construction-related mitigation measures may include the following:

- Impervious surfaces on the site would be maintained to suppress dust.
- Project-specific and appropriate BMPs for disturbed soil covers and/or stockpiled materials would be implemented.
- Construction would be planned to minimize exposing areas of earth for extended periods.
- Haul trips would be scheduled to avoid or reduce the need to stockpile materials that could generate dust, such as stockpiled soil or rock.
- Require appropriate emission-control devices on all construction equipment powered by gasoline or diesel fuel to reduce CO and NO_x emissions in vehicular exhaust.

3. Water

a. Surface

(1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, and wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

The project site is located within the Clover Creek/Chambers or Murray Creek drainage basins; however, other than water quality/infiltration ditches, there are no surface-water features on the site. There are no wetlands, streams, or other bodies of water present on-site or in the vicinity.

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

The proposed project would not require any work over, in, or adjacent to surface waters.

(3) Estimate the amount of fill and dredge material that could be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill materials.

No fill or dredge material would be placed in or removed from any surface-water body. While the proposed project would modify and fill existing water quality/infiltration ditches to provide appropriate track bedding for new tracks, equivalent methods would be provided on-site to manage stormwater runoff (pre-treatment prior to infiltration, etc.).

(4) Will the proposal require surface water withdrawals or diversion? Give general description, purpose, and approximate quantities, if known.

The proposed project would not require surface-water withdrawals or diversions.

(5) Does the proposal lie within a 100-year flood plain? If so, note location on the site plan.

The project site does not lie within a 100-year floodplain.

(6) Does the proposal involve discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No waste materials would be discharged to surface waters from construction or operation of the proposed project.

b. Ground

(1) Will ground water be withdrawn or will water be discharged to ground water? Give general description, purpose, and approximate quantities, if known.

No ground water would be withdrawn, nor would water be discharged to ground water as part of the proposed project.

(2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any. Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) is expected to serve.

No waste material would be discharged into the ground from construction or operation of the proposed project.

c. Water Runoff (including storm water)

(1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (including quantities if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Currently stormwater runoff on the project site is managed through pre-treatment prior to infiltration. A water quality/infiltration ditch provides pre-treatment of precipitation that is then infiltrated into subsurface soil. The characteristics of the native soil on the project site allow it to provide treatment of stormwater runoff. While the proposed project would fill existing water quality/infiltration ditches to provide appropriate track bedding for new tracks; new water quality/infiltration ditches would be provided east of the proposed access road to manage stormwater runoff.

(2) Could waste materials enter ground or surface waters? If so, generally describe.

Stormwater runoff would be conveyed in water quality/infiltration ditches and equivalent methods as described above. These waters would infiltrate into subsurface soil.

d. Describe proposed measures to reduce or control surface, ground, and runoff water impacts, if any.

Site disturbance and associated grading activities during construction could temporarily affect surface-water quality, but these impacts will be avoided or minimized with appropriate BMPs. Construction BMPs, such as the use of stabilized construction entrances, silt fencing, sediment traps, application of seeding or mulching for soil stabilization, or other techniques, would be implemented as necessary in accordance with the NPDES Construction Stormwater General Permit requirements.

4. Plants

a. Types of vegetation found on-site

- **Trees—**A patch of Garry oak is present east of the existing access road.
- **Shrubs—**The project site is characterized by sparse non-native shrubs, such as butterfly bush.
- **Grass—**The project site is characterized by a variety of non-native grass species inhabiting non-paved peripheral areas, such as crabgrass and velvet-grass.
- **Other types of vegetation—**Mosses and lichen are also present at the project site.

The area surrounding the project site is partially vegetated with several patches of trees, including Douglas fir (*Pseudotsuga menziesii*), walnut (*Juglans spp.*), maples (*Acer spp.*), poplar (*Populus spp.*), a small patch of Garry oak (*Quercus garryana*), and one Pacific madrone (*Arbutus menziesii*). Shrub species include scotch broom (*Cytisus scoparius*), butterfly bush (*Buddleja spp.*), Himalayan blackberry (*Rubus armeniacus*), and cutleaf blackberry (*Rubus laciniatus*). Common herbaceous species include California poppy (*Eschsolzia californica*), plantain (*Plantago spp.),* vetch (*Vicia spp.*), and grasses. Garry oak is Washington's only native oak and is the "official tree" of the City of Lakewood.

b. What kind and amount of vegetation will be removed or altered?

All existing vegetation would be removed from the project site. The patch of Garry oak mentioned above in Item 4a is east of the existing east access road and would not be disturbed.

c. List threatened or endangered species or critical habitat known to be on or near the site.

Oaks, including the patch of Garry oak mentioned above in Item 4a., provide food and habitat for numerous wildlife species including some that are state listed as Sensitive, Threatened, Endangered, or candidates for these listings. No state listed species were observed during the site visit.

d. Describe proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on-site.

The removal of grasses and small shrub vegetation near the rail bed would reduce habitat and could displace small mammals and birds. During construction, the patch of Garry oak that is east of the existing access road would be surrounded by a temporary three-foot high chain-link or plastic net fence to avoid damage to the trees or their root systems.

5. Animals

a. Underline any birds and animals which have been observed on or near the site or are known to be on or near the site.

Birds and animals that have been observed on or near the project site include the following:

- **Birds—**American crows, English sparrows, swallows, and pigeons.
- **Mammals—**Various small mammals that live in urban habitats may be present on or near the project site, including rabbits, opossums, mice, rats, shrews, moles, bats, squirrels, muskrats, and raccoon. Coyotes also have been observed.

b. List any threatened or endangered species or critical habitat near the site.

Threatened and endangered species that may use the project vicinity were identified using the U.S. Fish and Wildlife Service and National Marine Fisheries Service species list and the Washington State Department of Fish and Wildlife Priority Habitats and Species Database. Listed species would not be susceptible to impacts related to project activities. Bull trout do not occur in the project area. No impacts on Flett Creek, which is approximately 0.3 mile north of Steilacoom Boulevard SW, are expected with the implementation of construction stormwater BMPs. Therefore, there is no possibility of effects on Chinook salmon and steelhead from the project. Additionally, the project would have no effect on designated critical habitats for these species.

c. Is the site part of a migratory route? If so, explain.

Yes. The entire Puget Sound area is part of the Pacific Flyway for migratory birds.

d. Proposed measures to preserve or enhance wildlife, if any.

The removal of grasses and small shrub vegetation east of the railbed would remove habitat and could displace small mammals and birds. Increased train movements could disrupt wildlife. However, the site is in an urbanized area with existing rail traffic and industrial noise. It is also between arterials (100th Street SW and Steilacoom Boulevard SW). The patch of Garry oak mentioned above is east of the existing east access road and would not be disturbed.

Since the project would not involve in-water work and would have minimal impact wildlife habitat, including habitat of threatened or endangered species, no measures to preserve or enhance wildlife are proposed.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity would be used for standby power along tracks, site lighting for the access road and parking area, and powering the train and engine crew facility trailer(s).

b. Would the project affect the potential use of solar energy by adjacent properties? If so, explain.

The proposed project would not affect the use of solar energy by any adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any.

The project site would be lit with high-pressure sodium lamps to conserve energy, additionally the proposed project would comply with applicable requirements of the Lakewood Energy Code.

The overall effect of the proposed project would be to contribute to the reliability and efficiency of the commuter rail system (Sounder). In addition, Sound Transit would continue its independent efforts to reduce its fuel consumption and emissions as part of the agency's Sustainability Program.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spills, or hazardous waste that could occur as a result of this proposal? If so, describe.

Sound Transit conducted a hazardous materials investigation for the project site in June 2011 (GeoEngineers, 2011a). The purpose of the investigation was to provide a cursory review of concerns related to hazardous materials. The investigation included a search of the Environmental Data Resources (EDR) records for federal, state, local, and tribal environmental listings of properties with known or suspected environmental conditions on or near the project site. Ten potential properties of concern were noted in the EDR records search. However, none of these properties are located in areas that would be disturbed for construction of the project.

The construction contractor may use small amounts of diesel fuel oil, hydraulic fluid, construction adhesives, cleaning solvents, and similar chemical compounds on-site during construction. Other than these temporary construction uses, there would be no hazardous materials stored on-site.

(1) Describe special emergency services that might be required.

No special emergency services would be required beyond those occasionally needed by other similar facilities, such as police, fire, and emergency medical services.

(2) Describe proposed measures to reduce or control environmental health hazards.

Although no areas of concern were noted, unknown or unidentified subsurface contamination from past or present land use activities on the site may be encountered during earthwork or other construction activities. A formalized plan would be required for removal and treatment or disposal of any contaminated soil or groundwater encountered during construction. Any such occurrence would be managed using standard approaches in accordance with applicable requirements.

During construction, the contractor would be required to follow applicable Washington Industrial Safety and Health Administration regulations.

b. Noise

(1) What types of noise exist in the area which may affect your project (for example, traffic, equipment operation, other)?

Existing noise in the vicinity of the project site primarily consists of typical urban noise resulting from motor vehicle traffic on local streets. The existing noise environment is also influenced by periodic noise from commuter train service, freight train service, and commuter train storage on two existing layover tracks located adjacent to the proposed third layover track. Aircraft flyover noise is also present in the area with aircraft flying to and from Joint Base Lewis-McCord and nearby Clover Park Vocational Technical School Airport. Several light industrial businesses are located to the east and west of the project site and contribute to the existing noise environment.

(2) What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example: traffic, construction, operation, other)?

The area surrounding the proposed project includes primarily industrial and commercial land use with a residential community to the south. Residences are located to the south of the proposed project, south of 100th Street SW to the east and west of Lakeview Avenue SW. Southgate Elementary School is also located south of the proposed project and south of 100th Street SW. Cloverpark Technical College is located to the west of the proposed project and Mountain View Memorial Cemetery Park is located to the northwest.

The proposed project provides two new turnouts on existing track for trains to access the third layover track. The proposed project provides no new train service and no modifications to crossings or warning alarms. The proposed

project would provide layover storage for two commuter rail trains in the Seattle-to-Tacoma rail corridor. Train movements in the storage yard are restricted to 10 miles per hour (mph). The proposed project includes the addition of crew administration facility trailers and parking for 45 automobiles (35 staff).

No more than 20-30 new daily vehicle trips would result from the proposed project from staff traveling to and from the site. Given the high volumes of traffic currently using local streets, project-related traffic noise would not affect noise levels in the area.

During construction of track and yard improvements there would be temporary increases in sound levels near active areas of construction and along roadways used for construction vehicles traveling to and from the site. Temporary increases in vibration would also occur near activities, such as excavators that produce higher vibration levels. The amount of increase in noise and vibration levels would depend on the type and duration of equipment used. On-site equipment could include on-track rail equipment, dump trucks, dozers, excavators, graders, compact rollers, cranes, and pavers for demolition, grading, and construction. Sound levels generated during construction would be temporary in nature and would occur between the City of Lakewood's allowed construction time period of 7:00 a.m. to 10:00 p.m. on weekdays and 9:00 a.m. to 10:00 p.m. on weekends (Lakewood Municipal Code 08.36.010—Noise Control). Construction activities during nighttime hours (10:00 p.m. to 7:00 a.m.) that exceed these levels require a noise variance from the City of Lakewood.

The existing noise levels at sensitive receivers near the monitoring sites and near proposed project improvements were predicted to be the same or increase by 0 to 2 decibels with the addition of trains using the proposed Layover Track 3. Noise increases of less than 3 decibels are generally not noticeable to humans. Noise increases resulting from the proposed project did not reach Federal Transit Administration (FTA) Noise Impact Criteria. Given the relatively high volume of existing train traffic in the rail corridor and the five trains currently stored at the Lakewood Yard the storage and operation of two trains on the proposed third layover track would contribute a relatively minor amount of noise to the area.

Long-term noise would be similar to existing noise levels in the area.

Sensitive receptors are beyond the FTA vibration screening distances from the proposed project layover/storage track and yard improvements.

Additional information is available in Attachment C, Sounder Yard Expansion Noise and Vibration Technical Report.

(3) Describe proposed measures to reduce or control noise impacts, if any.

The proposed project would not result in noise impacts at or near the site; therefore, mitigation measures are not warranted. Because project construction is expected to be conducted during daytime hours and within daytime construction noise limits, mitigation is not required. The following mitigation measures could be implemented to reduce the potential effects of noise generated by construction of the track and yard improvements:

- Construction vehicles and equipment would be properly maintained.
- Stationary construction equipment would be placed as far away from sensitive receiving locations as possible.
- Construction activities would comply with the Washington State Noise Control Ordinance (WAC 173-60) and the City of Lakewood Noise Control Ordinance 08.36.010 to the extent feasible.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

The project site, located entirely within the railroad right-of-way, is currently used as a train yard for Sound Transit Sounder commuter rail service. Five, seven-car train sets are now stored at the yard. The site is in an area that is primarily developed as industrial between 100th Street SW and Steilacoom Boulevard SW (Figure 3).

Other land uses in this area include public and semi-public institutional (Clover Park Technical College to the west of the existing yard and the Pierce County Transit base to the east of the site) and commercial. Land uses south of 100th Street SW are primarily residential with a public and semi-public institutional use (Southgate Elementary School) located directly east of the railroad right-of-way. Land uses north of Steilacoom Boulevard SW include cemetery and commercial uses.

b. Has the site been used for agriculture? If so, describe.

The project site has not been used for agriculture.

c. Describe any structures on the site.

There are currently no structures on the project site.

d. Will any structures be demolished? If so, what?

No structures would be demolished.

e. What is the current zoning classification of the site?

The proposed project is located on a site that is zoned Industrial 1 (I1) by the City of Lakewood (Figure 4). The I1 zoning district provides for regional research, light manufacturing, warehousing, concentrated business/employment parks, and other major regional employment uses. Some primary permitted uses in the I1 zoning district include transportation, public maintenance facilities, utility facilities, storage, and contractor yards. The proposed project is consistent with the existing I1 zoning of the Lakewood Yard site.

f. What is the current comprehensive plan designation of the site?

The current comprehensive plan designation for the Lakewood Yard site is industrial.

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable. The project site lies outside the boundary of the shoreline master program.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

Based on maps published by Pierce County as part of its Title 18E regulations critical areas, the Lakewood Yard site is not located in a mapped critical area (steep slope, erosion, potential landslide, or known landslide area) (GeoEngineers, 2011b).

i. Approximately how many people would reside or work in the completed project?

No residential development is proposed as part of the project. A total of 35 staff would work at the project site once construction is completed.

j. Approximately how many people would the completed project displace?

The proposed project would not displace any people.

k. Describe proposed measures to avoid or reduce displacement impacts, if any.

Since the proposed project would not result in any displacements, no measures are necessary to avoid or reduce displacements.

l. Describe proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.

Measures to ensure the proposed project is compatible with existing and projected land uses include carefully designing the project to be safe and functional.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

No residential development is included as part of the proposed project.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

The proposed project would not displace any residential properties.

c. Describe proposed measures to reduce or control housing impacts, if any.

Because the proposed project would not impact housing, no measures are necessary to reduce or control housing impacts.

10. Aesthetics

a. What is the tallest height of any of the proposed structure(s), not including antennas? What is the principal exterior building material(s) proposed?

The proposed project includes the addition of an air compressor building as well as crew administration facility trailer(s). The air compressor building would have a maximum height of 16 feet while the crew administration facility trailer(s) would have a maximum height of 10 feet. The exterior of both proposed structures would be primarily composed of sheet metal siding.

b. What views in the immediate vicinity would be altered or obstructed?

Improvements proposed as part of the project would be similar in design and character to the existing yard site and would not have an adverse effect on key views from residences or public spaces. No scenic vistas would be affected.

c. Describe proposed measures to reduce aesthetic impacts, if any.

Existing development surrounding the project site is generally characterized as industrial and commercial-style businesses. Since the visual character and scale of the proposed project elements would be compatible with the existing character of the project site and surrounding uses, no measures are necessary to reduce aesthetic impacts.

11. Light and Glare

a. What type of light and glare will the proposal produce? What time of day would it mainly occur?

The primary source of light and glare from the completed project would come from trains and site lighting from dusk to dawn. The site would be lit with high-pressure sodium lamps to conserve energy and reduce glare.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

New site lighting would be shielded and directed toward the interior of the site to minimize lighting spill-over to adjacent properties and would not create a safety hazard or interfere with views.

c. What existing off-site sources of light or glare may affect your proposal?

No off-site sources of light or glare would affect the proposed project.

d. Describe the proposed measures to reduce or control light and glare impacts, if any.

No light and glare impacts are anticipated; therefore, no additional measures are proposed. The site would be lit with high-pressure sodium lamps to conserve energy and reduce glare. Lighting would be shielded and focused downward.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

No designated or informal recreational opportunities are located in the immediate vicinity of the proposed site.

b. Would the proposed project displace any existing recreational uses? If so, describe.

The proposed project would not displace any existing recreational uses.

c. Describe proposed measures to reduce or control impacts on recreation, including recreational opportunities to be provided by the project or applicant.

Since the proposed project would not result in any impacts on recreation in the immediate vicinity, no measures are necessary or proposed to reduce or control such impacts.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on or eligible for national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

There is one historic property eligible for the National Register of Historic Places (NRHP) within the Area of Potential Effects (APE). This property is a section of the Northern Pacific Railroad alignment that was recorded and recommended eligible for the NRHP by Jones and Stokes in 2008 (Jones and Stokes, 2008). Jones and Stokes (2008) recommended this section of the alignment eligible for the NRHP under Criterion A, "for the profound influence the rail line had in economic and residential development in the Pacific Northwest," and under Criterion B for its association with E.S. "Skookum" Smith, a Northern Pacific Railroad engineer. The eligibility was limited to the alignment rather than the physical equipment, which had been routinely replaced since the original period of construction. The Department of Archaeology and Historic Preservation (DAHP) concurred with this recommendation and determined the section of the rail alignment eligible for the NRHP in 2010 (DAHP, 2010).

b. Generally describe any landmarks or evidence of historic, archeological, scientific, or cultural importance known to be on or next to the site.

Review of archival information, including historic maps, historic documents, DAHP's Washington Information System for Architectural and Archaeological Records Data database and Pierce County Tax Assessor data indicated that there were no historically significant properties, buildings, structures, or objects older than 45 years within the APE, except for the Northern Pacific Railroad alignment discussed above in item 13a.

c. Describe proposed measures to reduce or control impacts, if any.

The proposed project would not constitute an adverse impact on the Northern Pacific Railroad alignment because the project would not alter the integrity of the rail alignment. The project elements would preserve its historic function as an operational rail line. The basic alignment grade or design, original alignment location, and association with the Northern Pacific Prairie Line and E.S. Smith

would not be affected by the project. The immediate setting on the railroad right-of-way is consistent with the period of original construction, although substantial changes in land use on each side have occurred since the early twentieth century. The project would add structures that would be visually consistent with the warehouses and commercial buildings along this section of the railroad corridor.

The project would not pose an adverse impact on the Northern Pacific Railroad alignment. No further action is required for architectural resources in the APE.

In the event that archaeological deposits are inadvertently discovered during construction in any portion of the APE, ground-disturbing activities in the vicinity of the find would be halted immediately, and Sound Transit will be notified immediately. Sound Transit will contact DAHP, as well as other agencies and affected Tribes, as appropriate. Additional information on inadvertently discovered archaeological deposits is provided in the Cultural Resources Assessment (Attachment B to this Environmental Checklist).

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on-site plans, if any.

Major east–west arterials serving the project site include 100th Street SW to the south and Steilacoom Boulevard SW to the north. Both are designated principal arterials based on the City of Lakewood municipal code (12A.09.022) with speed limits of 35 mph and two travel lanes in each direction. A center two-way left-turn lane is provided along both of these arterials in the vicinity of the project. The nearest north–south principal arterial is South Tacoma Way, which lies approximately one-half mile to the east and is similarly configured with two lanes in each direction and a center two-way left-turn lane. Major freeways and highways in the vicinity of the project site include I-5 and SR 512 (an east–west state highway), both located less than one mile away to the east.

The project site is accessed via existing driveways at 100th Street SW and Steilacoom Boulevard SW. The driveways are located east of the Sounder/Amtrak rail line and restricted to right-in and right-out movements because of their proximity near the tracks and the existing raised arterial medians on 100th Street SW and Steilacoom Boulevard SW. Traffic levels along 100th Street SW and Steilacoom Boulevard SW are moderate to high. Twenty-four hour two-way traffic counts in 2011 and 2012 showed average daily volumes of 19,400 vehicles per day

on 100th Street SW (near South Tacoma Way) and 22,300 vehicles per day on Steilacoom Boulevard SW (also near South Tacoma Way).

b. Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Public transit near the project site is provided by Pierce Transit bus service. Three main bus routes serve the site with stops near, or relatively near, the main access driveways: Route 48 along 100th Street SW (south side of the site), Route 3 along Steilacoom Boulevard SW (north side of the site), and Route 300 on South Tacoma Way (one-half mile east of the site).

Table 1. Bus Routes Serving Project Site

Bus Route	Relevant Arterial	Origin-Destination	Peak-Period Frequency	Weekday Hours of Operation	Nearest Stop to Site
3	Steilacoom Blvd SW	Lakewood – Tacoma	30 minutes	5 a.m. – 10 p.m.	< 500 feet
48	100th St SW	Lakewood – Tacoma	30 minutes	5 a.m. – 9:30 p.m.	~ 1/4 mile
300	South Tacoma Way	Tacoma Mall – Joint Base Lewis-McChord	30 minutes	6 a.m. – 9 p.m.	~ 1/2 mile

As shown in Table 1, bus service for the above three routes is provided during the hours when employees are expected to arrive at (4:00 p.m.) and depart from (7:00 a.m.) the site.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Parking would be provided (up to 45 spaces) adjacent to the crew administration facility. No spaces would be eliminated.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe.

A new paved road would provide access to and from the crew administration facility trailer(s) and on-site facilities. This roadway would be designed and constructed based on typical city and industry standards and would connect to the existing main site driveways at 100th Street SW and Steilacoom Boulevard SW on the east side of the rail tracks.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

The project would construct a new side track to allow for commuter rail train storage, but access to and from the site would be via private vehicle (auto, light truck, etc.) or bus.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

The hours of operation for the project site would remain the same as the current facility from roughly 4 p.m. to 7 a.m. with employees arriving and departing in a "reverse" commute format. Based on the anticipated facility operations, the project is expected to generate approximately 35 trips during a typical a.m. peak commute hour (5 entering and 30 exiting) and 35 trips during the p.m. peak commute hour (30 entering and 5 exiting). By comparison, an estimated 15-20 inbound and outbound employee trips currently occur at the start and end of each maintenance shift based on field observations. Therefore the expanded Sounder Yard facility would be expected to generate 15-20 additional trips at the beginning and end of a typical work day (or 30 to 40 daily trips) which is considered modest. This is also shown in Table 2 below.

Table 2. Project Estimated Trip Generation

Time Period	Existing Trips (Vehicles)	Future Trips (Vehicles Estimate)	New Net Trips (Vehicles)
Peak Hour	15-20	35	15-20
Daily (24-hours)	40-50	80	30-40

While occasional vendor activity (deliveries) may occur around the shift start and end times, the bulk of entering and exiting trips would consist of employees arriving at or leaving the site. Trips associated with employee breaks (dinner, snacks, coffee, errands, etc) would also occur during the single night time shift (4 p.m. to 7 a.m.) but would be spread out during the shift.

g. Describe proposed measures to reduce or control transportation impacts, if any.

Because of the modest trip redistribution associated with the proposed project and the retained hours of operation from approximately 4 p.m. to 7 a.m., no mitigation measures would be required.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally explain.

The proposed project is not expected to generate an increased need for public services.

b. Describe proposed measures to reduce or control direct impacts on public services.

No impacts to public services are anticipated; therefore, no measures are necessary or proposed to reduce or control such impacts.

16. Utilities

a. Underline utilities currently available at the site

Electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic systems, other

Utilities currently available on the project site include natural gas, fiber optic, overhead power, underground power and water. There is also a dry line for the Lakewood Fire Department.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Sound Transit plans to provide sewer service to the proposed crew administration facility (Figure 1: Project Elements). The sewer service would be extended from the existing Pierce County Sewer Utility sewer main located east of the railroad right-of-way and along 39th Avenue Court SW. The sewer connection would require an easement across property owned by West Pierce Fire & Rescue. The easement would comprise about a 10 to 15 foot-wide strip along the southern edge, which is currently being used as parking lot. Other than the construction period, the easement would not adversely affect this use. Due to the proximity of gas, water, and communications lines in 39th Avenue Court SW, these utilities may also be extended through the easement area. Sound Transit may also need to acquire temporary construction easements on other private property.

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature Mark Stewart

Name (print) MARK STEWART

Title ENVIRONMENTAL MANAGER

Date Submitted 11/4/13

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Figure 1: Project Elements

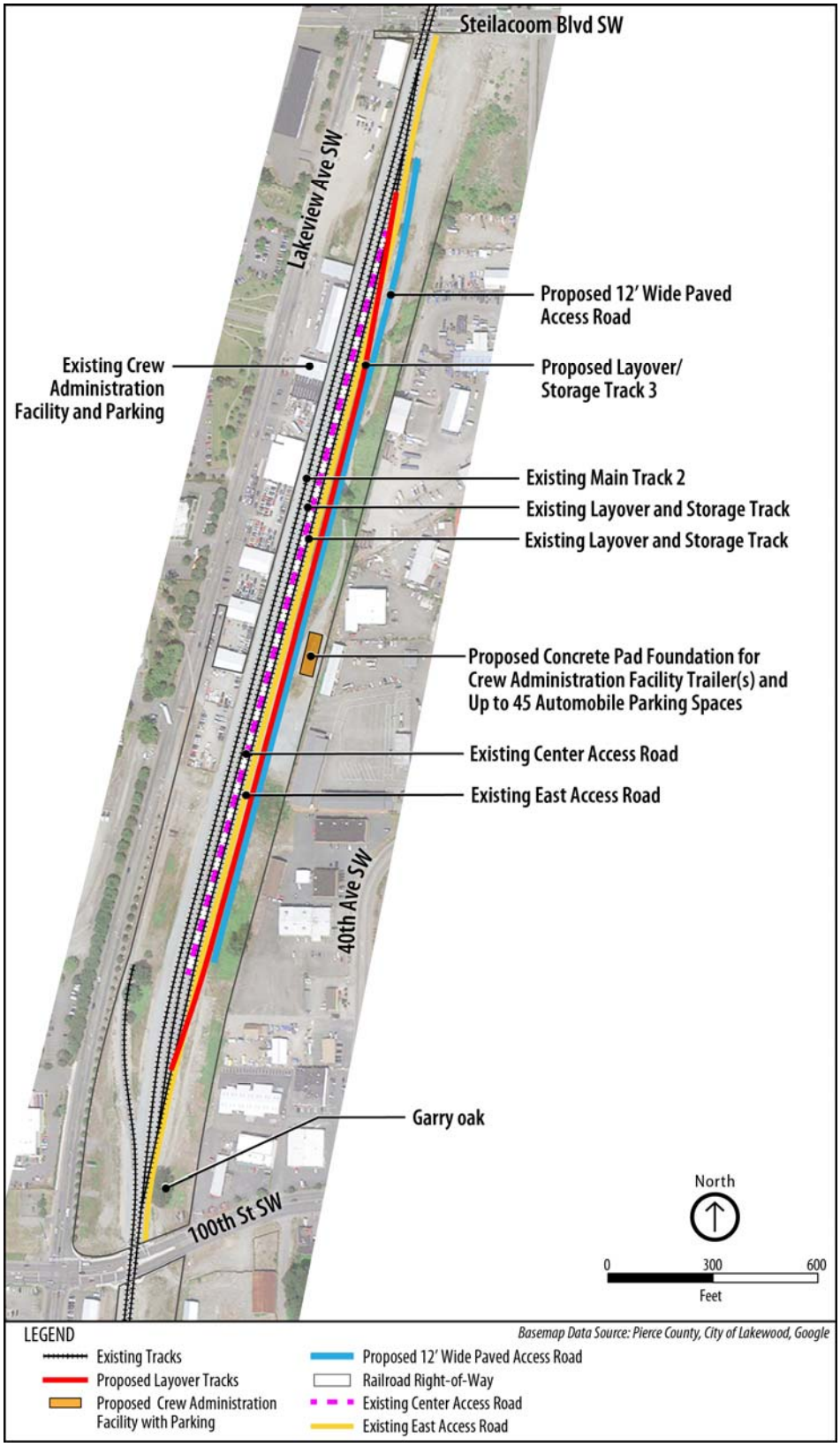

Steilacoom Blvd SW
Lakeview Ave SW
Proposed 12' Wide Paved Access Road
Existing Crew Administration Facility and Parking
Proposed Layover/ Storage Track 3
Existing Main Track 2
Existing Layover and Storage Track
Existing Layover and Storage Track
Proposed Concrete Pad Foundation for Crew Administration Facility Trailer(s) and Up to 45 Automobile Parking Spaces
Existing Center Access Road
Existing East Access Road
40th Ave SW
Garry oak
100th St SW
North
0
300
600
Feet
LEGEND
Basemap Data Source: Pierce County, City of Lakewood, Google
Existing Tracks
Proposed Layover Tracks
Proposed Crew Administration Facility with Parking
Proposed 12' Wide Paved Access Road
Railroad Right-of-Way
Existing Center Access Road
Existing East Access Road

Figure 2: Project Vicinity Map

Figure 3: Project Site and Surrounding Land Uses

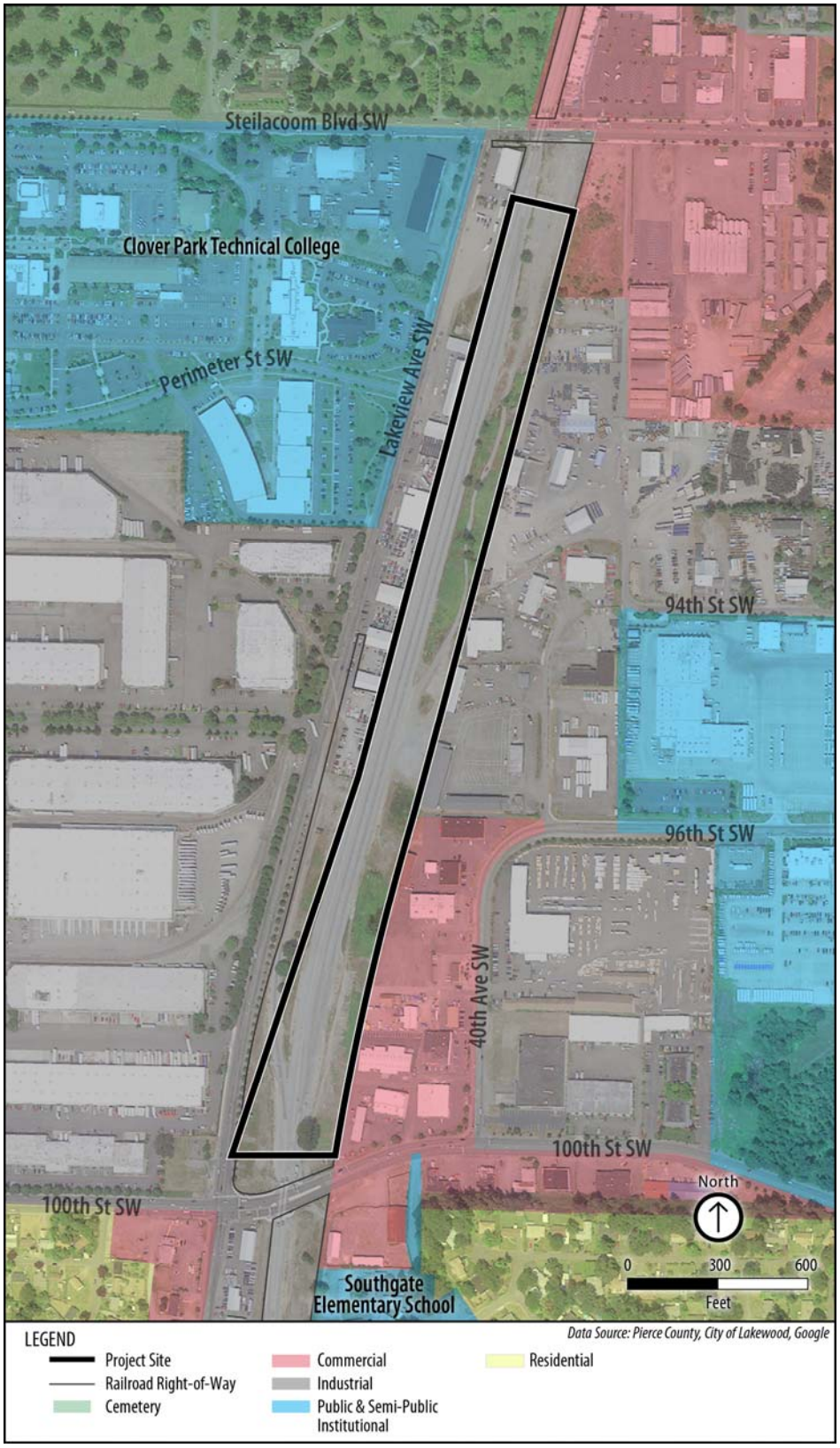
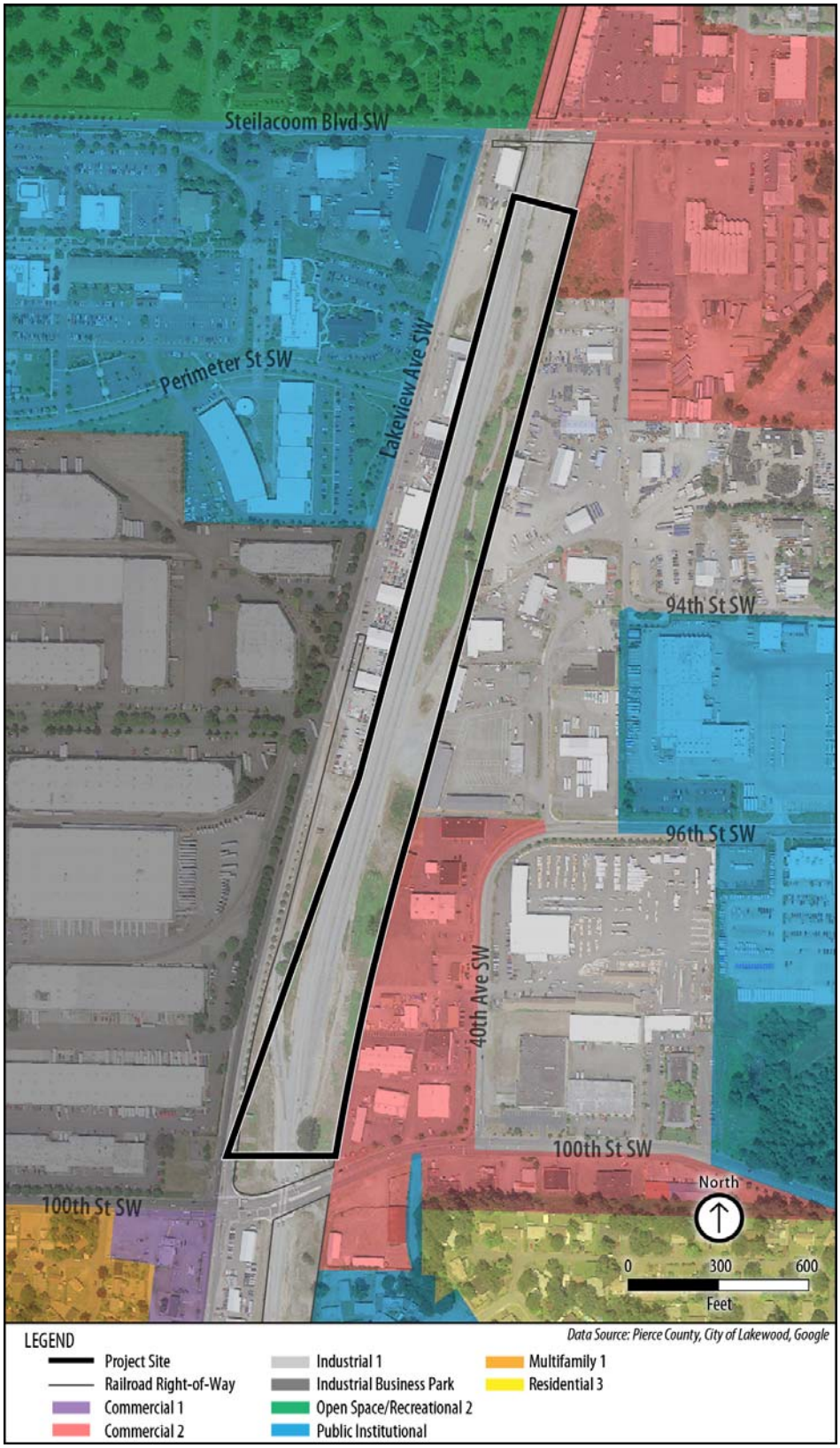


Figure 4: Project Site and Surrounding Zoning



Attachment A
List of Fisheries Threatened and Endangered Species

Table A-1. U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration–Fisheries threatened and endangered species that may use the project vicinity (Duwamish River)

Species	Current Status	Critical Habitat Designation	Effect Determination
Bull trout (*Salvelinus confluentus*)	Threatened	Final October 18, 2010	Species: No Effect Critical Habitat: No Effect
Chinook salmon (*Oncorhynchus tshawytscha*)	Threatened	Final September 2, 2005	Species: No Effect Critical Habitat: No Effect
Steelhead (*Oncorhynchus mykiss*)	Threatened	Proposed January 14, 2013	Species: No Effect

Source: Herrera Environmental Consultants, 2013

Attachment B
Cultural Resources Assessment for the Sounder Yard Expansion Project

CULTURAL RESOURCES REPORT COVER SHEET

Author: Stevenson, Alexander E. and Matthew Sneddon
Title of Report: *Cultural resources Assessment for the Sounder Yard Expansion Project, Lakewood, Washington*

Date of Report: July 11, 2013

County(ies): King Section: 36 Township: 20N Range: 02E
Section: 01 Township: 19N Range: 02E

Quad: Tacoma South Acres: ~1

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☒ Yes ☐ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☒ Yes ☐ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:
45PI11304

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.

Cultural Resources Assessment for the Sounder Yard Expansion Project, Lakewood, Washington

Submitted to:
Parsons Brinckerhoff

Submitted by:
Historical Research Associates, Inc.
Alexander E. Stevenson
Matthew Sneddon

Seattle, WA
August 2013

HISTORICAL
RESEARCH
ASSOCIATES, INC.

This report was prepared by HRA Principal Investigator Alexander E. Stevenson, M.S., who meets the Secretary of the Interior's professional qualifications standards for archaeology and HRA Historian Matthew Sneddon, Ph.D., who meets the Secretary of the Interior's professional qualifications standards for history and architectural history. This report is intended for the exclusive use of the Client and its representatives. It contains professional conclusions and recommendations concerning the potential for project-related impacts to archaeological resources based on the results of HRA's investigation. It should not be considered to constitute project clearance with regard to the treatment of cultural resources or permission to proceed with the project described in lieu of review by the appropriate reviewing or permitting agency. This report should be submitted to the appropriate state and local review agencies for their comments prior to the commencement of the project.

Executive Summary

Sound Transit is proposing to expand the Sounder yard at the existing Lakewood Yard, the Sounder Yard Expansion Project (Current Project). Current Project improvements include a new layover track that would provide the capacity to accommodate storage of seven, eight-car train sets with standby power outlets on the site (currently five, seven-car train sets are stored at the yard). Train and engine crew facility trailer(s) would be added along the east side of the new track, along with up to 45 automobile parking spaces. The existing yard roadways, site lighting security system, and drainage facilities would be updated as described below. Parking, administrative buildings, access roads, and other improvements are also planned. Sound Transit is also considering construction of a maintenance facility as well as additional yard tracks at this location. This project (Potential Future Project) is in the early planning stages. The Area of Potential Effects (APE) includes project elements and planned construction limits for both the yard expansion (Current Project) and the potential maintenance facility.

Parsons-Brinkerhoff was contracted by Sound Transit to perform design and permitting services for the Project. Historical Research Associates, Inc. (HRA), was contracted by Parsons-Brinckerhoff to perform cultural resources consultation for the Project. The Project is subject to environmental analysis under the National Environmental Policy Act (NEPA), and qualifies as a Documented Categorical Exclusion (DCE). A cultural resource survey is required because Sound Transit may receive funding from the Federal Transit Authority (FTA) and the Project is defined as a federal undertaking. Under Section 106 of the National Historic Preservation Act (NHPA), any project receiving funding or permitting or being conducted on federal lands, and that is defined as an federal undertaking, must be performed in compliance with this regulation.

In May of 2013, HRA conducted a cultural resources inventory of the APE. The archaeological inventory included pedestrian transects and an archaeological subsurface survey, which consisted of excavation of 15 shovel probes. One cultural isolate (45PI1304), a fence post, was identified during the inventory. Since it is a cultural isolate and a very common resource, it is not eligible for the National Register of Historic Places (NRHP), Washington Heritage Register (WHR), or Lakewood Landmarks; therefore, the Project will not adversely affect any archaeological resources and further study is unnecessary.

The architectural inventory included recordation and evaluation of all unrecorded buildings, structures, and objects 45 years old or older in the APE. Two previously unrecorded buildings were identified. HRA recommends that neither of the two buildings is eligible for listing in the NRHP,

WHR, or Lakewood Landmarks. Since these resources do not appear eligible, they will not be adversely affected by the Project and further study is not warranted.

In addition, HRA evaluated the Project's potential to adversely affect the historic Northern Pacific Railroad (NPRR) alignment, an NRHP eligible property located within the APE (DAHP 2010). It is HRA's conclusion that the Project poses no major impacts to the integrity and significance of the NPRR alignment. HRA recommends a finding of no adverse effect for this property, and that no further study is necessary. If there are substantial changes to the current project design, further cultural resources studies for the Sounder Yard Expansion Project may become necessary.

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1. Introduction and Project Description

1.1 Introduction

Sound Transit's Sounder Yard Expansion Project (Current Project) would add a third track for train storage at the existing Lakewood Yard. Project improvements include a new layover track that would provide the capacity to accommodate storage of seven, eight-car train sets with standby power outlets on the site (currently five, seven-car train sets are stored at the yard). Train and engine crew facility trailer(s) would be added along the east side of the new track, along with up to 45 automobile parking spaces. The existing yard roadways, site lighting security system, and drainage facilities would be updated as described below. Parking, administrative buildings, access roads, and other improvements are also planned. Sound Transit is also considering construction of a maintenance facility as well as additional yard tracks at this location. This project (Potential Future Project) is in the early planning stages. The Area of Potential Effects (APE) includes project elements and planned construction limits for both the yard expansion (Current Project) and the potential maintenance facility.

The project is located in Section 36 of Township 20 North, Range 2 East, and Section 1 of Township 19 North, Range 2 East. It extends from Steilacoom Boulevard Southwest along the existing railroad tracks, south to 108th Street Southwest (Figures 1-1 and 1-2).

Parsons-Brinkerhoff was contracted by Sound Transit to perform design and permitting services for the Project. Historical Research Associates, Inc. (HRA), was contracted by Parsons-Brinckerhoff to perform cultural resources consultation for the Project.

1.2 Current Project Description

Sound Transit is proposing to add a third track for train storage at the existing Lakewood Yard. Currently five, seven-car train sets are stored at the yard. The new layover track would provide the capacity to accommodate storage of seven, eight-car train sets with standby power outlets on the site. Crew administration facility trailer(s) would be added along the east side of the new track, along with up to 45 automobile parking spaces that would replace and provide more staff capacity than the existing crew administration facility currently located west of the Lakewood Yard site. The existing yard roadways, site lighting, security system, and drainage facilities would be updated as described below.

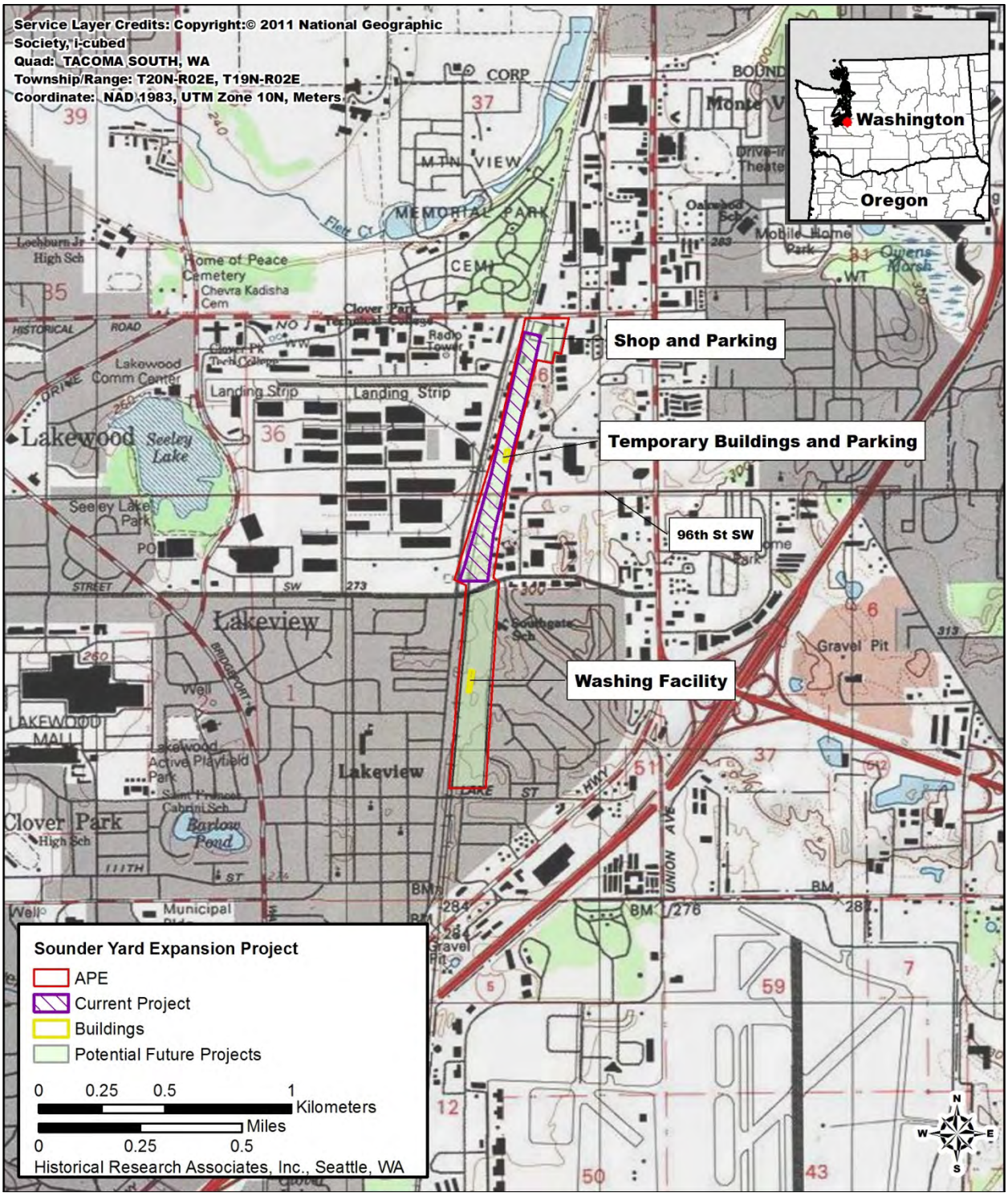

Figure 1-1. Location of the APE

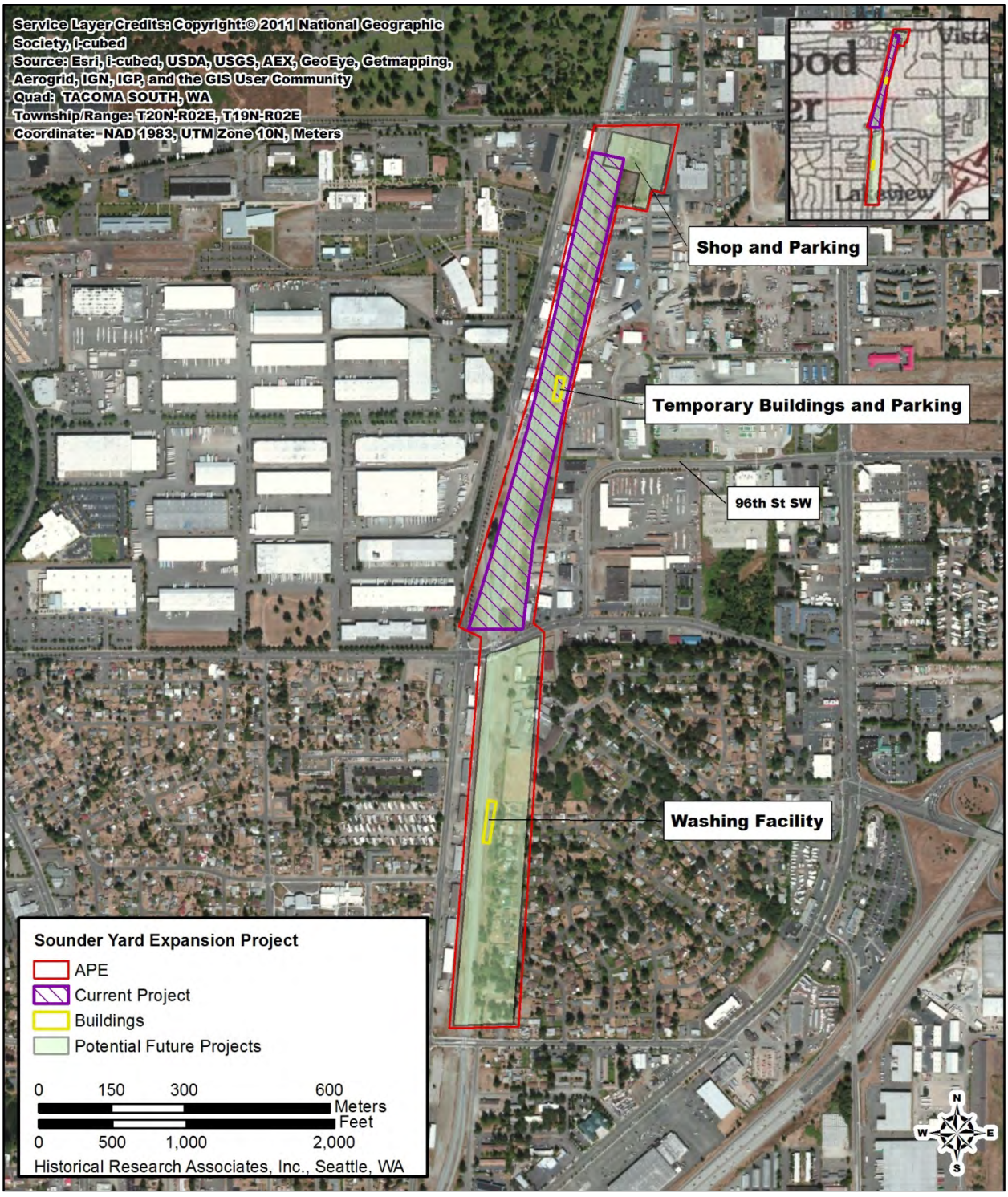

Figure 1-2. Location of the APE and vicinity

- Third layover/storage track and turnouts at each end of the layover yard
- Trailer(s) with approximately 3,200 square feet of space for crew administration
- Concrete pad foundation for trailer(s)
- Up to 45 automobile parking spaces
- Retaining walls where required
- Air lines and air compressor building
- Standby power along tracks
- New access road along the east side of the new storage tracks
- Sewage dump station
- Site lighting for the access road and parking area
- Filling of the existing water quality/infiltration ditches to provide appropriate track bedding for new tracks and replacing drainage function with new water quality/infiltration ditches east of the proposed access road
- Paving the remainder of the existing Center Access Road and existing East Access Road

Sound Transit would also conduct geotechnical explorations within the right of way to support design and engineering activities. Soil explorations would consist of test pit holes approximately 5 feet to 10 feet depth for infiltration testing. At least four test pits would occur along the length of the third track, with the addition of one at proposed parking lot and one at proposed crew administration facility site.

1.3 Potential Future Project Description

In addition to the proposed project, Sound Transit is also considering construction and operation of a maintenance facility and additional yard tracks at this location, although a determination to proceed with these potential future improvements has not been made at this time. The proposed project has independent utility from the future potential maintenance facility project. Additional storage is needed whether or not the potential future maintenance facility is constructed at this location or at all. If the maintenance facility were constructed at another location, storage tracks at this location remain useful and the storage tracks would not preclude consideration of alternative sites for a maintenance facility.

1.4 Regulatory Context

The Project is subject to environmental analysis under the National Environmental Policy Act (NEPA) and qualifies as a Documented Categorical Exclusion (DCE). A cultural resource survey is required because Sound Transit may receive funding from the Federal Transit Authority (FTA) and the Project is defined as an undertaking. Under Section 106 of the National Historic Preservation Act (NHPA), any project receiving funding or permitting or being conducted on federal lands, and that is defined as an undertaking, must be performed in compliance with this regulation.

1.5 Area of Potential Effects

The APE extends for a total of approximately 1.25 miles from Steilacoom Boulevard Southwest to 108th Street Southwest (Figures 1 and 2). The APE incorporates project elements for Current and Potential Future Projects. The Washington Department of Archaeology and Historic Preservation (DAHP) concurred with the APE on May 22, 2013 (Sterner 2013).

2. Archival Research

This chapter provides a review of archival data including previous cultural resources surveys; documented archaeological sites, historic sites, structures, and objects; and historic maps. Understanding previous cultural resource surveys and known cultural resources in the vicinity of a project is important for understanding how intensively work has been conducted in the area. This archival research is necessary for developing expectations for this Project which will be outlined in Section 5.

2.1 Research Methods and Materials Reviewed

HRA project archaeologist Alexander Stevenson conducted an archival record search for the project. Mr. Stevenson searched the DAHP confidential online Washington Information System for Architectural and Archaeological Records Data (WISAARD) database for archaeological site records, cultural resource survey reports, cemetery records, Historic Property Inventory (HPI) forms, and for National Register of Historic Places (NRHP), Washington Heritage Register (WHR), and Lakewood Landmark resources within ½ mile of the APE. The statewide predictive model in WISAARD was reviewed in order to assess the probability of archaeological resources within the APE.

HRA's in-house library was used to obtain information on the environmental, archaeological, and historical context of the project area. Nineteenth-century General Land Office (GLO) plats from the United States Surveyor General (USSG), as well as Metsker and Sanborn Fire Insurance maps, were reviewed in order to identify historic structures, sites, and features which may remain within the APE. Prior to surveying the project area, HRA architectural historian Matthew Sneddon consulted WISAARD and Pierce County tax assessors' records to determine the age of buildings, structures, or objects (BSOs) within the APE. Research for the historic context of the site utilized historic maps, United States Geological Survey (USGS) aerial photography, Bureau of Land Management (BLM) records, the University of Washington and Seattle Public Library, newspapers, and the Tacoma Public Library's (TPL) online resources.

2.2 Archival Research Results

2.2.1 Previous Cultural Resources Studies

Three previous cultural resource surveys have been performed within ½ mile of the APE (Table 2-1). Two of these surveys (Jones and Stokes 2008; Van Galder et al. 2012) have focused specifically on the railroad alignment which is included in the current study.

Table 2-1. Previous Cultural Resources Studies within Approximately 0.5 miles of the APE.

NADB #	Reference	Title	Description	Identified Cultural Resources within APE	Identified Cultural Resources Outside APE
1351522	Jones and Stokes 2008	Final Cultural Resources Survey/Discipline Report: Point Defiance Rail Bypass Project, Pierce County, Washington	Archival research, Pedestrian and subsurface survey	Northern Pacific Railroad Alignment recorded and evaluated; likely eligible for NRHP under criteria A and B	36 historic structures/objects identified and evaluated; three historic archaeological sites and two historic isolates identified
None	Silverman and Dellert 2011	Cultural Resource Reconnaissance Survey of the Woodland to St. Claire Transmission Line Project, City of Lakewood, Pierce County, Washington	Archival research, Pedestrian and subsurface survey	None	None
None	Van Galder et al. 2012	Federal Railroad Administration – WSDOT Point Defiance Bypass Project Environmental Assessment: Section 106 Discipline Report	Archival research, pedestrian and subsurface survey	None	HPIs updated; One archaeological site identified (45PI1263)

Silverman and Dellert (2011) surveyed locations near the APE. These investigators excavated nine shovel probes, but did not encounter any subsurface cultural resources.

Subsurface survey within the APE has been limited. Jones and Stokes (2008) excavated three shovel probes. The locations of two of these probes are within the APE of the Sounder Yard Expansion Project; neither of these yielded cultural materials. Van Galder et al. (2012) excavated five shovel probes. These were located more than 2 miles southwest of the APE.

All of the surveys have included above ground, built environment survey components as well, but have not recorded any buildings within or immediately adjacent to (within one tax parcel) the APE.

2.2.2 Archaeological Sites

No previously recorded archaeological sites exist within ½ mile of the APE.

2.2.3 Historic Buildings, Structures, and Objects

One historic BSO was identified in or within ½ mile of the project APE. The Northern Pacific Railroad (NPRR) alignment was recorded by Jones and Stokes (2008) and determined eligible for the NRHP by the Washington State Department of Transportation in 2010 (DAHP 2010). The current Sound Transit rail line follows the alignment, which runs the length of the APE.

To provide extra time for project permitting, Sound Transit requested that HRA identify all buildings 45 years old or older in the APE for potential survey, inventory, and evaluation rather than using the 50-year-old age criterion for eligibility for the NRHP, WHR, and Lakewood Landmarks register. HRA reviewed the Pierce County Tax Assessor's records for the properties within the APE and identified eighteen BSOs over 45 years old, listed in the table below and shown in Figure 2-1 on the next page. Sixteen of the BSOs were previously recorded on HPI forms, and determined not eligible for the NRHP and WHR by DAHP in 2010. Tax records showed one BSO in the APE that had not yet been recorded.

2.2.4 Cemeteries

One cemetery is located within ½ mile of the APE. The Mountain View Memorial Park is located on the north side of Steilacoom Boulevard Southwest, west of the Sound Transit rail alignment. This cemetery is adjacent to and not within the APE for the project.

2.2.5 Historically Significant Properties

The segment of the NPRR discussed above has been determined to be eligible for listing on the NRHP (DAHP 2010).

2.2.6 Ethnogeography

Thomas Talbot Waterman, an early twentieth century anthropologist working in the Pacific Northwest, recorded three ethnographic place names in the vicinity of the APE (Hilbert et al. 2001). *d¢ù(ù)iya c€,* the Lushootseed name for American Lake (3 miles southwest of the APE), has been translated to mean a "a place without a hand." Gravelly Lake or *sc¢tù¢d*, meaning "black bear," is located approximately 2 miles southwest of the APE. The nearest ethnographically recorded village is *sc(i)tilq^{w}¢d,* which is said to have been located at the mouth of Chambers Creek, roughly 4 miles west of the APE. *Sc(i)tilq^{w}¢d* may refer to either the village or the people from the village that lived "near the water" (Hilbert et al. 2001:328). Marian Smith, who wrote a Puyallup-Nisqually ethnography, performed his fieldwork in the region during 1935. His (1940) information on this place is consistent with Hilbert and colleagues' (2001) translation of the term *sc(i)tilq^{w}¢d*.

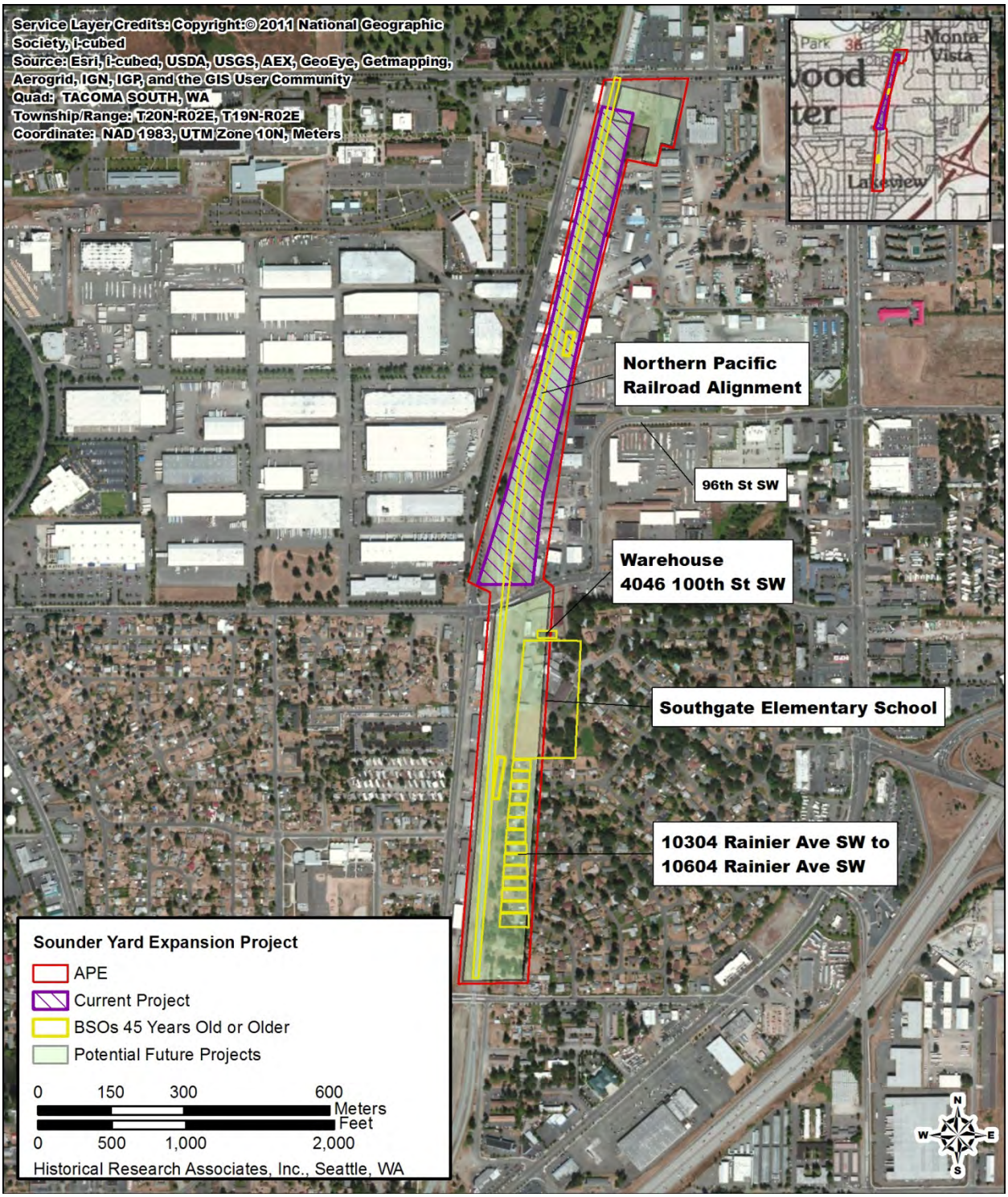
Service Layer Credits: Copyright:© 2011 National Geographic Society, i-cubed
Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Quad: TACOMA SOUTH, WA
Township/Range: T20N-R02E, T19N-R02E
Coordinate: NAD 1983, UTM Zone 10N, Meters
Northern Pacific Railroad Alignment
96th St SW
Warehouse 4046 100th St SW
Southgate Elementary School
10304 Rainier Ave SW to 10604 Rainier Ave SW
Sounder Yard Expansion Project
APE
Current Project
BSOs 45 Years Old or Older
Potential Future Projects
0 150 300 600
Meters
Feet
0 500 1,000 2,000
Historical Research Associates, Inc., Seattle, WA
N
W
E
S

Figure 2-1. Locations of Buildings, Structures, and Objects 45 Years Old or Older in the APE.

Table 2-2. Buildings, Structures, and Objects 45 Years Old or Older in the APE.

BSO	Address	Tax Parcel	Build Date	Eligibility Status
Northern Pacific Railroad Alignment	10401 Lakeview Ave SW	0219011133	1873	Previously Determined Eligible
Southgate Elementary	10202 Earley Ave SW	0219011116	1953	Previously Determined Not Eligible
Southgate Elementary	10202 Earley Ave SW	0219011116	1956	Previously Determined Not Eligible
Kamm house	10304 Rainier Ave SW	7765300900	1958	Previously Determined Not Eligible
Giron house	10308 Rainier Ave SW	7765300890	1958	Previously Determined Not Eligible
Seelye house	10312 Rainier Ave SW	7765300880	1958	Previously Determined Not Eligible
Studholme house	10402 Rainier Ave SW	7765300870	1958	Previously Determined Not Eligible
no name listed	10404 Rainier Ave SW	7765300010	1955	Previously Determined Not Eligible
Johnson house	10412 Rainier Ave SW	7765300020	1955	Previously Determined Not Eligible
Saitta house	10418 Rainier Ave SW	7765300030	1955	Previously Determined Not Eligible
Cooke house	10424 Rainier Ave SW	7765300040	1955	Previously Determined Not Eligible
Eugenio house	10504 Rainier Ave SW	7765300050	1955	Previously Determined Not Eligible
St. Cyr house	10512 Rainier Ave SW	7765300060	1955	Previously Determined Not Eligible
Alejandro house	10518 Rainier Ave SW	7765300070	1955	Previously Determined Not Eligible
Nelson house	10524 Rainier Ave SW	7765300080	1955	Previously Determined Not Eligible
Speight house	10530 Rainier Ave SW	7765300090	1955	Previously Determined Not Eligible
Webber house	10604 Rainier Ave SW	7765300100	1955	Previously Determined Not Eligible
Lakes Auto Wrecking	4046 100th St SW (2 buildings)	0219011113	1952	Not previously recorded

2.2.7 Historic Maps

2.2.7.1 General Land Office Plats

General Land Office plats for T20N, R2E, Section 36 (USGS 1856, 1869) and T19N, R2E, Section 1 (USGS 1871, 1873, 1884, 1886) were reviewed in order to identify structures, objects, or archaeological sites that may be located within the APE.

The portion of the APE north of the current location of 96th Street Southwest (T20N, R2E, Section 36) was owned by the Puget Sound Agricultural Company in 1856, but was subdivided by 1869. The owners of the land, including that in the APE, are not identified on the 1869 GLO for this vicinity. No structures or objects are noted in the vicinity of the APE north of 96th Street Southwest.

Review of GLO plats south of 96th Street Southwest indicates that there was little to no development within the APE. Based on reviews of the GLOs detailing the area south of 96th Street Southwest (T19N, R2E, Section 1), it appears a structure, likely a house, attributed to Moses Ward was located near the center of Section 1, outside the APE, on the eastern shore of a body of water, probably Seeley Lake, which emptied, by way of a small stream, into Lake Steilacoom (USGS 1871). A second structure appears on this same map, near the north end of this body of water, outside the APE. Subsequent GLOs do not depict these structures or the small body of water. I. J. Keach purchased land on the eastern edge of this section sometime between 1871 and 1882; however, this does not include land within the APE. An 1871 GLO covering this section of the APE highlights the NPRR alignment evaluated by Jones and Stokes (2008).

2.2.7.2 Sanborn Fire Insurance, Metsker, and Kroll Maps

Several different map resources were used to determine historical property ownership in the vicinity of the APE. Except for the railroad right-of-way, which is owned by the NPRR Company, a 1915 Kroll Atlas of Pierce County identifies the northern part of the APE as "School Land;" ownership of the southern part is divided among several individual land owners and the "Town Plat of Lakeview" (Kroll 1915a, 1915b). By 1950, the US Navy had acquired a substantial lot that bordered the northwest edge of the APE, as shown on a suburban Sanborn Fire Insurance Map. Other land ownership in the area was not specified in this map. A Pierce County Metsker map from a year later, in 1951, shows land ownership in addition to the naval depot. Land along the east side of the APE was owned by two entities: R. A. Mueller owned the land north of Mount Tacoma Drive (now 96th Street South), while the land south of Mount Tacoma Drive was owned by the Harrison Brothers Company (Metsker 1951a, 1951b). Nine years later, another Metsker map from 1960 shows that north of 100th Street Southwest, some of the federal property to the west that formerly served as the naval depot was now owned by Clover Park School District No. 400; to the east, a steel fabrication company acquired land north of that still owned by the Harrison Brothers. South of 100th Street Southwest, land to the west of the APE was divided among individual residential owners, and land

to the east was owned by the Harrison Brothers, Clover Park School District (Southgate Elementary School), and additional residential owners (Metsker 1960a, 1960b).

2.2.8 DAHP Predictive Model

DAHP's predictive model is based on statewide information, using large-scale factors. Information on geology, soils, site types, and landforms, and GLO maps were used to establish or predict probabilities for prehistoric cultural resources throughout the state. DAHP's model uses five categories for the predictions: Low Risk, Moderately Low Risk, Moderate Risk, High Risk, and Very High Risk. The DAHP predictive model map indicates the APE extends across Moderate and High Risk areas.

3. Environmental Context

This chapter provides a brief overview of the local environment including historic modification to this landscape and natural resources. Understanding the local environment including geology, climate flora and fauna is important for understanding how people used the landscape in the past. This environmental context is necessary for developing expectations for this Project, which will be outlined in Section 5.

3.1 Topography and Geology

The APE is located within the Southern Puget Sound Basin, a portion of the Puget Trough Physiographic Province (Franklin and Dyrness 1973). The north-south trough of the Puget Lowland separates the Olympic Mountains to the west from the Cascade Range on the east. The lowland was carved out during the last major glaciation of western Washington, which ended approximately 16,000 years before present (B.P.) (Alt and Hyndman 1995; Booth et al. 2004; Dethier et al. 1995; Easterbrook and Rahm 1970:49; Galster and Laprade 1991:249). As glaciers retreated, they left thick deposits of recessional outwash. This outwash, as well as till and glacial drift, forms the parent material of many soils throughout this part of Pierce County, including the APE (Snyder et al. 1973). The APE exists on a glacial upland comprised of continental glacial drift (DNR 2012). The surface of the glacial deposit has remained unmodified by natural forces since the end of the Fraser glaciation approximately 15,000 B.P. (Troost et al. 1999). Since the retreat of glaciers in this location, the landscape, including the APE, has been available for human habitation and human use.

3.2 Climate and Vegetation

Between approximately 13,000 and 12,000 years ago, the region had a much cooler and drier climate, than during much of the preceding Pleistocene. This climate supported an ecosystem characterized by lodgepole pine (*Pinus contorta*), sedges (*Cyperaceae* sp.), sage (*Artemisia*), and a variety of grasses and herbs. After 12,000 years ago, the climate warmed while continuing to dry, and Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and red alder (*Alnus rubra*) joined the developing parkland forest. By around 6,000 years ago, the climate of the region had cooled and moistened to levels comparable to today's maritime regime, producing the current western hemlock (*Tsuga heterophylla*) vegetation zone. Presently, uplands are moderately to heavily forested with Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and western red cedar (*Thuja plicata*). Red alder (*Alnus rubra*) and big-leaf maple (*Acer macrophyllum*) represent secondary species in forested habitats and are dominant in disturbed areas (Barnosky 1984; Barnosky et al. 1987; Brubaker 1991; Whitlock 1992).

3.3 Fauna

Throughout the Holocene, and prior to extensive Euroamerican influence in the area, larger terrestrial mammals would have included elk (*Cervus elaphus*), deer (*Odocoileus* spp.), black bear (*Ursus americanus*), coyote (*Canis latrans*), and mountain lion (*Felis concolor*) (Johnson and Cassidy 1997). Smaller mammals that inhabited the area included snowshoe hare (*Lepus americanus*), raccoon (*Procyon lotor*), and beaver (*Castor canadensis*) (Krukeberg 1991; Larrison 1967). Intertidal species like clams (e.g., *Tresus* sp. and *Protothaca* sp.) are found on nearby beaches. Marine mammals like the Pacific harbor seal (*Phoca vitulina*) are found in waters just west of the APE. Avifauna found in the Puget Sound region include raptors such the bald eagle (*Haliaeetus leucocephalus*) and waterfowl (*Aix* and *Anas* species). Pacific salmon and trout (*Onchorhynchus* spp.) would have been available in the region and from waterways near the APE (Quinn 2005). Freshwater mussels (*Anodonta* spp. and *Margaritifera falcata*) are known to occur in Lake Steilacoom and Chambers Creek, near the APE (Xerces 2010).

4. Cultural Context

This chapter provides a brief overview of nearly 14,000 years of human occupation in North America, focusing specifically on western Washington and the Puget Sound area where possible. Understanding the history of human occupation and land use in an area is crucial for understanding how archaeological data is important and what kinds of archaeological sites may be encountered during a project. This context is necessary for outlining the current state of knowledge about past lifeways and contributes to the development of expectations for this Project, which will be discussed in Section 5.0.

4.1 Prehistoric Background

The current state of knowledge of Pacific Northwest precontact lifeways is derived from the archaeological record, which is constantly changing as our knowledge grows. How archaeologists see archaeological data is conditioned by a number of factors, including natural (e.g., rising sea levels) and cultural (e.g., excavation, curation, etc.) processes, which selectively modify what remains for modern investigators to be seen (Schiffer 1987). New discoveries can either change or reinforce prior notions of human lifeways, but the continually growing body of archaeological data helps give archaeologists a better understanding of the past (Trigger 2008).

In order to organize current knowledge of Pacific Northwest precontact lifeways, numerous investigators have proposed chronologies for the region's archaeological record (e.g., Ames and Maschner 1999; Kidd 1964; King 1950). Ames and Maschner's (1999) chronology is used here to structure discussion of precontact archaeology and inferred lifeways. Their chronological sequence is divided into three basic developmental periods: Paleoindian, Archaic, and Pacific. The archaeological evidence from these periods suggests a gradual shift from small nomadic groups relying on generalized hunting and gathering to larger sedentary groups with increased social complexity and specialized reliance on marine and riverine resources (Ames and Maschner 1999). In essence the archaeological record in the region documents a shift from foraging to collecting strategies (Binford 1980) and cultural change toward ethnographically observed lifeways.

4.1.1 Paleo-Indian (~12,500 B.C. to 10,500 B.C.)

Evidence for late Pleistocene occupation of western North America comes from a very small number of archaeological sites, including Paisley 5-miles Cave in Oregon (Gilbert et al. 2008), and sites on California's Channel Islands (Erlandson et al. 2011). Data from these sites have reinforced the idea that these first inhabitants of the region lived in small groups, were probably highly mobile, and followed the migration patterns of animals across the landscape. Mounting evidence (e.g.,

Dillehay et al. 2008) suggests that occupants of the "new world" exploited both marine and terrestrial environments, contrary to long held hypotheses (e.g., Martin 1967). Up to now, no archaeological sites dating to the late Pleistocene have been discovered in the Puget Sound region.

The earliest sites in the Pacific Northwest date to the early Holocene and are commonly associated with Clovis points, an iconic large spear point found across much of North America during this time (Meltzer and Dunnell 1987; Osborne 1956). These sites are said to represent the remains of mobile hunting activities and are scarce in the Pacific Northwest. Clovis points have been recovered from sites across the Puget Sound, including Olympia (Osborne 1956). Other early western Washington sites dating to this period include the Manis Mastodon site (45CA218) near Sequim, and 45KI839 on Bear Creek in Redmond. The Manis site dates to roughly 11,800 B.P., and consists of the remains of a mammoth found in a peat bog with a human-made bone point lodged in a rib fragment (Waters et al. 2011). Site 45KI839 dates to approximately 10,000 to 12,000 B.P., and consists of a highly diverse stone tool kit (Kopperl et al. 2010). This site has been interpreted as a short term occupation site and has yielded evidence of mammal, fish, and plant exploitation. The Manis and Bear Creek sites have demonstrated that the earliest inhabitants of western Washington were not simply big game hunters who used large stone tools to kill game. These sites demonstrate the implementation of a diverse toolkits and subsistence strategies, signaling an excellent working knowledge of the landscape and available resources.

4.1.2 Archaic (10,500 B.C. to 4400 B.C.)

Sites dating to the Archaic period, especially prior to 5000 B.P., are rare, at least in part because of natural processes, like sea level rise, which have undoubtedly obscured sites that are currently underwater. The current view of this period is generally one of stasis, but this is likely at least partially conditioned by the rarity of sites dating to this period.

Lifeways during the Archaic period are thought to have changed little from the Paleoindian period. People are thought to have hunted game and lived in small highly mobile egalitarian groups, as foragers (*sensu* Binford 1980). Microblades and leaf shaped projectile points (i.e., Cascade points) have been used to argue for Archaic period occupation across Western (e.g., Chatters et al 2011; Greengo and Houston 1957). Identifiable faunal remains are rare at Archaic period sites making inferences about subsistence difficult but mammal and fish remains have been reported from Archaic period sites in the Puget Sound region (Chatters et al. 2011; Elder, personal communication 2013; Stilson and Chatters 1981).

The most discussed sites dating to the Archaic period are often referred to as "Olcott" sites (Kidd 1964). These sites typically lack good absolute dates, are highly disturbed, are located near rivers, and contain expedient tools such as scrapers, flaked cobbles, and debitage in addition to large lanceolate and stemmed projectile points. Much discussion of these sites has taken place in the last 50 years (e.g., Chatters et al. 2011; Dancey 1969; Kidd 1969; Morgan 1999; Stilson and Chatters 1981). The sites were thought to represent short-term camps where hunting and game processing was the

primary focus of activity (Kidd 1964). Investigators like Dancey (1969), Morgan (1999), and others have refuted Kidd's (1964) initial interpretation, and Chatters et al. (2011) have recently suggested that "Olcott" sites represent the cultural remains of a group of people well adapted to unpredictability who used both plants and animals but were still highly mobile.

The Zumwalt site (45PI251), located west of the APE, is one of the few sites in Pierce County with a documented "Olcott" like assemblage (Gallison and Wessen 1984). This site appears to have been intermittently occupied for nearly 6,000 years (roughly 9000 to 3000 B.P.), spanning much of the Archaic period. Stone tools recovered from the site were primarily made from basalt and include numerous cores, leaf shaped projectile points, a single microblade, and a single triangular projectile point, a form commonly ascribed to later occupations in the Puget Sound region.

4.1.3 Pacific (4400 B.C. to A.D. 1775)

Based on the archaeological record, the Pacific period is the most culturally dynamic precontact period in the Pacific Northwest (Chatters 1987; Larson and Lewarch 1995; Lewarch 2006). Over time, changing technologies and site locations suggest increased sedentism and specialization in the use of particular environments and resources (Ames and Maschner 1999). During this period evidence of exploitation of the littoral environment increases, shell middens become a prominent site type across Puget Sound. After about 5000 B.P., populations on or near the Puget Sound coast grew and became more complex in organization. Technological organization and subsistence practices became increasingly complex during the Pacific period as well. During this period, there is apparent increasing emphasis on the use of plants including berries and root-vegetables (e.g., Elder and Sparks 2010). Social stratification and inequality, a hallmark of Northwest coast cultures, is thought to be less pronounced in the Puget Sound than in other parts of the Pacific Northwest; however, objects like labrets, indicative of social stratification, appear early in the Pacific period in the Puget Sound at sites like West Point (45KI248) (Larson and Lewarch 1995). By shortly after 2500 B.P., a variety of bone, chipped stone, and groundstone artifacts represent coastal marine-oriented cultures and inland hunting/fishing/gathering cultures (Ames and Maschner 1999; Nelson 1976, 1990).

Shell midden sites dating to the past several thousand years have been recorded in and around the Puget Sound area. The most well studied shell middens are found around Seattle. The West Point sites (45KI428 and 45KI429), located at Discovery Park in West Seattle, have been interpreted as long-term camping and food-processing activity areas (Larson and Lewarch 1995). Five distinct cultural components indicate use of the sites between 4200 and 200 B.P. These sites included a number of personal items, including beads, bracelets, and labrets, which may be related to developing social inequality in the region (Ames and Maschner 1999). The West Point sites also yielded a highly diverse tool kit, including bone as well as ground and chipped stone implements used for capturing and processing prey (Larson and Lewarch 1995). The highly diverse faunal

assemblage includes sea mammals, fish, terrestrial mammals, birds, and shellfish, indicating exploitation of a number of available niches.

A number of shell middens exist in Pierce County, but are generally much less well studied than those in Seattle. A high concentration of these sites exists on McNeil Island, located west of the APE (Kennedy 1980). Sites like the Zumwalt site, which was occupied during the Archaic and Pacific periods (Gallison and Wessen 1984), exist in settings similar to that of the APE. These types of sites indicate a highly varied landuse pattern within Pierce County during the Pacific period.

4.2 Ethnographic Background

The APE is located within the traditional territory of the Southern Lushootseed speaking peoples of the Steilacoom, Puyallup, and Nisqually groups (Suttles and Lane 1990). Smith (1940) notes that the Steilacoom inhabited the nearby village of *sc(i)tilqʷ¢ɑ* . Gibbs (1855) and Eells (in Castile 1985) referred to these people as the Steilakimahmish and the Stulakumamish, respectively. Based on information provided by Smith (1940:31), the Steilacoom were primarily focused on exploitation of marine resources.

Southern Lushootseed peoples comprise part of the Coast Salish cultural group (Suttles and Lane 1990), which spans much of the area from the southern sound into southern British Columbia. The Coast Salish peoples spent the majority of the winter inside large longhouses made from cedar planks (Haeberlin and Gunther 1930; Waterman and Greiner 1921). These houses held large extended family groups as well as much of the food they would need for the cold months. The houses were often arranged into villages of two to five structures either near beaches or along important watercourses. Family connections and political alliances were cemented through a flexible system of exogamy.

During spring, fall, and summer, people from the winter villages dispersed to hunt, fish, and gather plant foods for immediate consumption and winter storage (Haeberlin and Gunther 1930; Smith 1940). Summer camps usually consisted of small, temporary reed or grass-mat structures occupied by a single family, although several families might join together to build a larger mat house (Haeberlin and Gunther 1930; Suttles 1990; Suttles and Lane 1990). Settings like the APE (i.e., upland environments) not only attracted and supported deer and elk populations for hunting, but likely also provided a variety of plant resources such as berries, nuts, and root foods. Also in the uplands, prairies were maintained through intentional burning which cleared the land providing suitable habitat for game and camas.

4.3 Historic Background

4.3.1 Early Euroamerican Settlement in the Southern Puget Sound

The Puget Sound region was first explored by Euroamericans in 1792, when Captain George Vancouver claimed land for King George III of Great Britain. Settlement, however, did not begin in earnest until the 1830s, when the Hudson's Bay Company (HBC) established Fort Nisqually for agricultural pursuits at the mouth of the Nisqually River (Becker 2006). By 1838, HBC officials established the Puget's Sound Agricultural Company (PSAC) here, focusing on animal husbandry in the Fort Nisqually vicinity. The PSAC founded a number of satellite stations across its estimated 150,000 acres on the Nisqually Plains. One such station, "Whyatchie" (or Whiatchi), the Native name for Steilacoom Lake, was located on the eastern shore of the lake, and consisted of fenced fields and sheep pens. Records indicate that crops grown here around 1845 included peas, cabbage, potatoes, and oats—the usual crops for this vicinity. The Whyatchie station was abandoned by 1852 (Dickey 1994:5).

The establishment of the HBC outpost promoted trade and settlement in the region. Further explorations and fur trading expeditions began in the 1840s and, with the Donation Land Act of 1850, the influx of settlers truly began in the Puget Sound region. Washington became a Territory in 1853, and a state by 1889 (Schwantes 1989:95–106). In December 1854, the Treaty of Medicine Creek was signed between 62 leaders of major western Washington tribes (including the Steilacoom, Puyallup, and Nisqually) and Washington Territorial Governor, Isaac I. Stevens. The Treaty was ratified by Congress on April 10, 1855, and it established two reservations for Pierce County Indians. Many Steilacoom resettled on the Puyallup and Nisqually Reservations after the Treaty of Medicine Creek was signed (Steilacoom Tribe 2010). Disputes amongst the native populations and Euroamerican settlers erupted in the Indian Wars of 1855–1856.

4.3.2 Development of Lakeview and Lakewood

The City of Lakewood took shape on an earlier townsite platted as Lakeview. Lakeview was named for a nearby railway station on the NPRR's transcontinental line to Tacoma that was completed in 1873 (Phillips 1971:75). The arrival of the Northern Pacific stimulated additional railroad construction, economic development, and population growth in the Puget Sound region. An 1889 map of Pierce County (Figure 4-1) shows Lakeview—about 7 miles south of Tacoma—at an important crossroad between the Union Pacific and Northern Pacific lines, and some of the early land claims in the area, including I. Keech to the southwest and W. P. Dougherty to the north (Plummer 1889). One of the major north-south roads also passed through Lakeview, which later became the route of the Pacific Highway that ran from Vancouver to Blaine (Pierce County Immigration Association 1897).

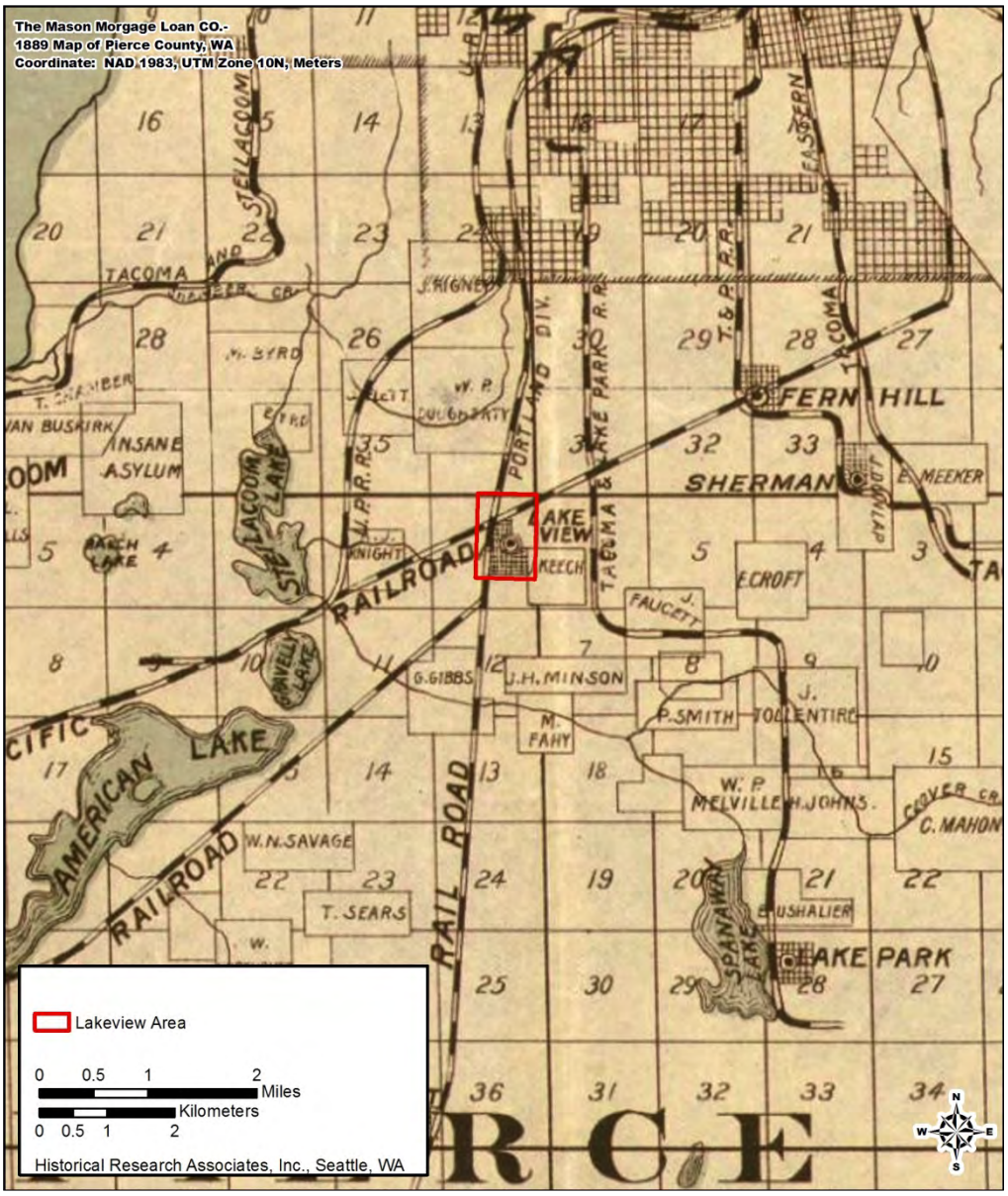

Figure 4-1. 1889 Map of Pierce County Showing Relationship of Lakeview to Tacoma (Plummer 1889).

Despite the town plat, railroad station, and thoroughfare, the area around Lakeview was slow to develop. Lakeview was too far from Tacoma to count as an early suburb, but the area once known as "the prairie" began to attract residential developers and wealthy Tacoma residents looking to build estates outside of the city in the early twentieth century (Dunkelberger and Neary 2005:43–44). In 1910, the Tallman-Thompson Company, a real estate firm, advertised residential lots in a development called "Lakewood," later adopted as the incorporated city's name (Dunkelberger and Neary 2005:40). A photograph of the area in 1920 near the APE shows a largely rural setting

(Figure 4-2) (TPL 1920a). Somewhere just to the north stood the grandstands of the Tacoma Speedway, which first opened in 1912.

The Tacoma Speedway was one of the top automobile racing venues in the United States in the early twentieth century (Dunkelberger 2004). Races on July 4, 1914 attracted 35,000 spectators and almost 5,000 more were turned away at the gates (TPL 1914). Originally a 5-mile long dirt track, the speedway was shortened and rebuilt in 1915 with a wood surface to improve driving conditions, especially during wet weather (TPL 2013). A photograph from 1922 shows two racers competing on the wood track (Figure 4-3) (TPL 1922).

Figure 4-2. Aerial Photograph of the vicinity of the APE in 1920 (TPL 1920a)

Figure 4-3. Racers on the Wood Track at the Tacoma Speedway in 1922. (TPL 1922)

The shorter course, shown on a 1915 Kroll Map of Pierce County (Figure 4-4), was roughly bounded by what is now Steilacoom Boulevard to the north, Gravelly Lake Drive to the west, 100th Street Southwest to the south, and Lakeview Avenue Southwest to the east (Kroll Map Company 1915b). The eastern part of the track ran along a path close to the western edge of the APE.

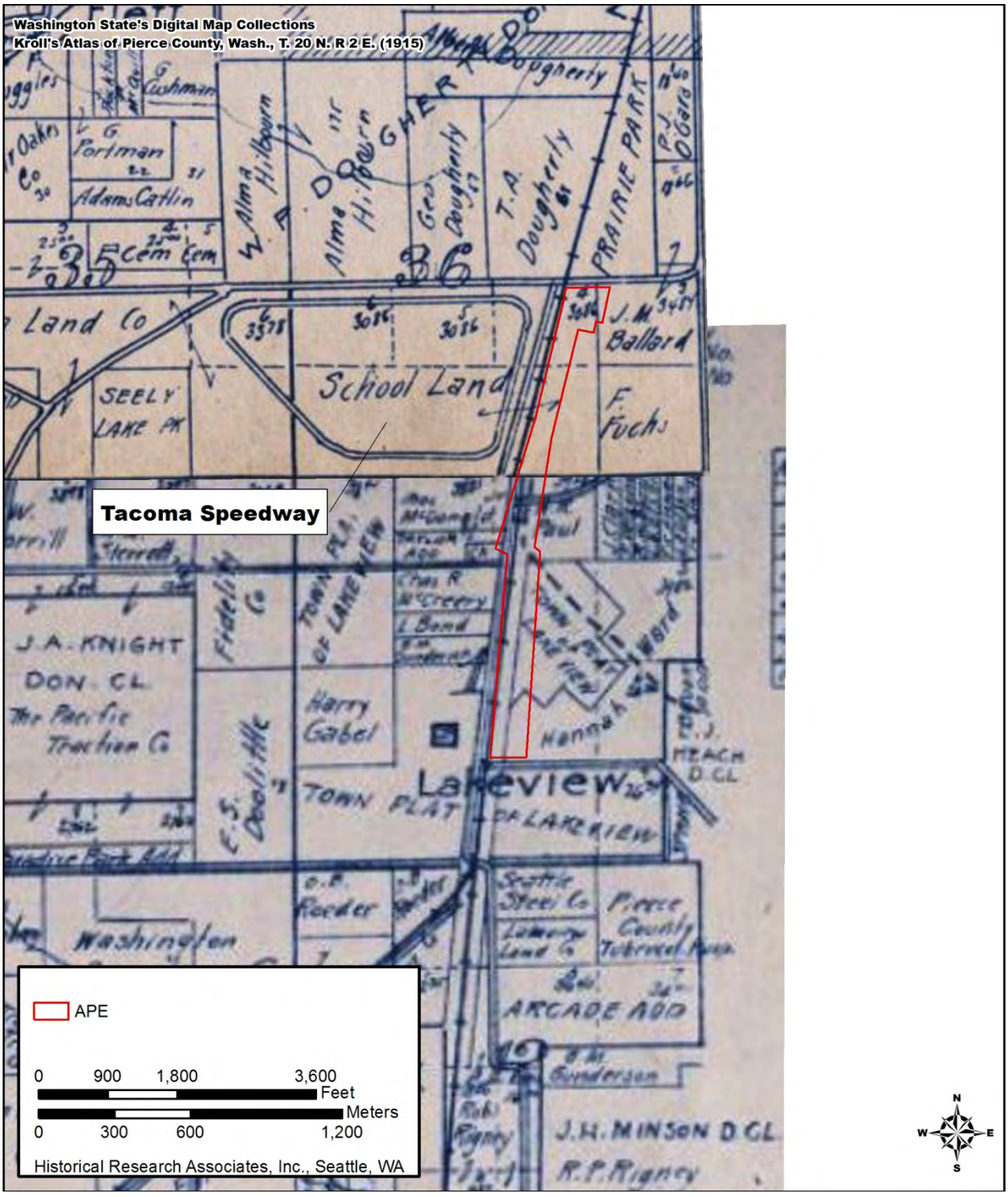

Figure 4-4. Kroll Map of Pierce County, Township 20N, Range 2E, WM in 1915 (Kroll 1915b).

Although over 40,000 fans turned out in 1920 to watch the 225 mile classic, the biggest car race in Tacoma's history, just two years later financial problems closed the track (TPL 1920b). The site was soon converted to an airfield, shown below (Figure 4-5) when known as the Mueller Harkins Airport. The airfield was considered one of the finest private fields in the Northwest, and was noted as a training ground for the Civilian Pilot Training Program (1939–1944), a federal program following a European model to increase the number of civilian pilots and military preparedness. According to the TPL's Image Archives, the program also provided new opportunities in aviation for women and African Americans (TPL 1939).

Figure 4-5. Hangar at Mueller Harkins Airport (TPL 1939).

In the later years of the Great Depression, Lakewood began to add some of the foundations of future growth and community identity. In 1937, one of the nation's early shopping malls was built about a mile west of the APE, and a year later the US Army constructed McChord Airfield on the site of the old County Air Field to the southeast, adding to a military presence in the area that dated back to the establishment of Fort Steilacoom in the mid-nineteenth century (Dumond 2013). Land use in the immediate project area remained relatively unchanged during the 1930s, except for the rerouting of the Pacific Highway, which formerly ran parallel to the Northern Pacific tracks to the roadway now known as South Tacoma Way. The retired section of the old Pacific Highway was renamed Lakeview Avenue Southwest (ILWU 2013).

During World War II, the Navy acquired the Mueller Harkins Airport and built the Pacific Advance Naval Base in Lakewood, more familiarly known as the Lakewood Navy Yard, on the property (TPL 1950). An aerial photograph from 1941 shows the area still largely undeveloped; the faint outline of the old Tacoma Speedway is still visible, a few structures are clustered near the site of the old Northern Pacific Lakeview Station and Lakeview School, and a gravel pit covers a sizeable area

northeast of the current intersection at Lakeview Avenue Southwest and 100th Street Southwest (USGS 1941). Construction of the naval yard did not begin until 1944. A 1951 Metsker's map lists the gravel pit property as owned by the Harrison Brothers Company (Metsker 1951a). Metsker's maps and aerial photographs suggest that the two warehouses surveyed for this project were built by Harrison Brothers Company in the early 1950s to support either the gravel pit operations or the company's contractor business (Metsker 1960a, 1960b; USGS 1957).

Another aerial photograph, taken sixteen years later in 1957 (Figure 4-6), shows signficant changes in the area (USGS 1957). The Navy yard occupies a large property west of the Northern Pacific tracks between Steilacoom Boulevard and 100th Street Southwest. Some homes and commercial structures appear to the east.

Residential neighborhoods fill the land south of 100th Street Southwest, many homes built to meet the postwar population boom in the Pacific Northwest. One 1952 Lakewood development by March Construction Company, Lakeview Village (Figure 4-7), offered afforable two-bedroom homes in a World War II-era Cottage Style built in vast numbers across the nation (DAHP 2013a). Typical of rapid residential growth, school construction followed. Southgate Elementary School was built in 1952 on property adjacent to and east of the railroad tracks just south of 100th Street Southwest (Pierce County 2013).

The Navy yard was also undergoing change. After only seven years of service, the Navy began to phase out operations at the Lakewood Yard in 1951. Several buildings were taken over by the Clover Park Vocational-Technical Institute, which by 1961 occupied all of the former Navy buildings (Clover Park Technical College 2013). The school eventually redeveloped the site, but some Navy buildings and the former Mueller Harkins Airport hangar still stand as markers of the site's earlier history. In contrast, the Northern Pacific's historic Lakeview Station, located on the west side of the Northern Pacific tracks between Pacific Street Southwest and Hayden Street Southwest, was torn down at some point after it ceased operations in 1967 (Ferris 2012). One of the stations built during the initial construction of the Prairie Line, Lakeview Station, had occupied the site for nearly a century. The station was associated with the expulsion of the Chinese from Tacoma in 1885, when a mob rounded up the city's Chinese residents and marched them to Lakeview Station for a one-way trip south out of Tacoma. Ironically, many of the Chinese swept from the city had helped build the railroad just twelve years earlier. (Dunkelberger and Neary 2005:100).

Other major developments in the area during the 1960s included the grading over of the former Holroyd gravel pit for a commercial zone, and the completion of Interstate 5 to the south (USGS 1968). By next decade, the area around the APE had acquired much of its current character: a mixed use zone that combined residences, schools, an industrial park, and commercial structures. Warehouses are prevalent in the area. Ownership of the Northern Pacific tracks through Lakewood had earlier passed to a new company formed by the merger of several railroad companies, the Burlington Northern and Santa Fe (BNSF 2013:3).

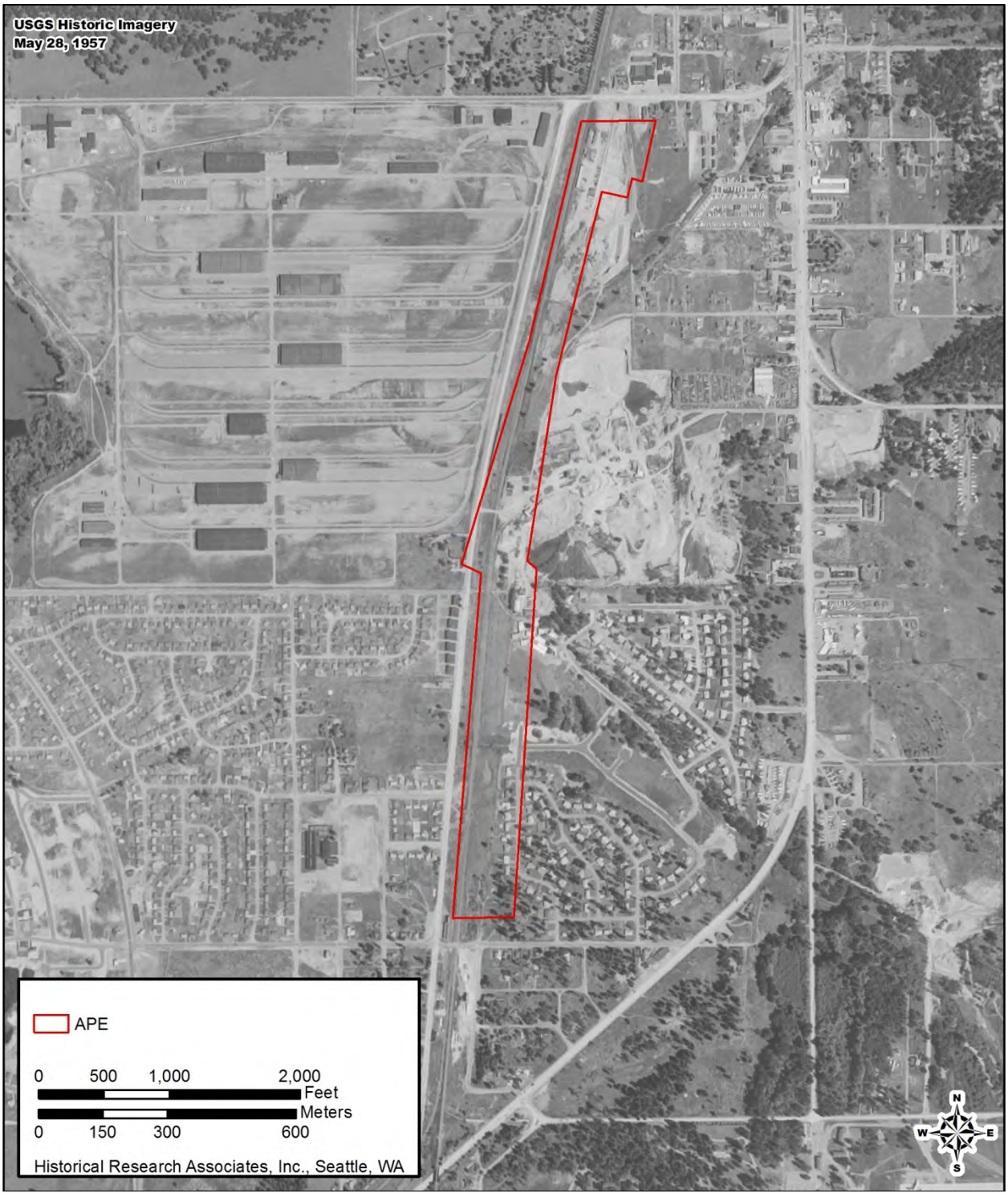

Figure 4-6. 1957 Aerial Photograph of Area near Project APE (USGS 1957).

Figure 4-7. Lakeview Village (TPL 1952).

5. Expectations for Cultural Resources within the APE

5.1 Archaeological Expectations

Based on archival research, as well as the environmental and the cultural settings of the APE, there is a low to moderate probability for observing precontact to ethnohistoric period cultural remains. Settings similar to that of the APE would have been the focus of hunting and gathering activities. Expected artifacts and features would relate to these activities. Although the APE has been the subject of development over the past 100 years, anticipated materials could include fragments of fire-modified rock (FMR), either singly or in intact clusters (sometimes with charcoal and/or oxidized soils), indicating the presence of cooking or processing hearths; lithic and/or bone tools and tool fragments; and isolated bone tools and tool fragments.

The likelihood of finding historic-period archaeological remains is moderate to high, given the use of the APE as an important transportation corridor, early in the history of Washington State. Historic features and artifacts encountered would likely be associated with the NPRR and facilities constructed to support operation of this railway. Artifacts and features may include railroad spikes, brick, nails, glass and metal refuse, building foundations, and objects related to operation of the railway (e.g., portions of signals).

5.2 Architectural Expectations

Research conducted prior to the field survey suggested a low probability for significant new historical resources in the APE. Tax parcel information indicated the presence of only a single building over 45 years old in the project APE, a warehouse that appeared to be of standard construction from satellite imagery.

Given that the Project proposes no significant changes to the existing alignment, the Project is not expected to pose an adverse effect on the NRHP-eligible NPRR alignment; however, the field survey was conducted with potential impacts on the NRHP property's character defining features and historic integrity in mind.

6. Field Strategy and Methods

6.1 Archaeological Inventory

HRA archaeologists Alexander E. Stevenson, M.S., Angus Tierney, M.A., and Adam Frugé, B.A., conducted an archaeological inventory on May 29, 2013. The inventory included pedestrian survey and shovel probe excavation (subsurface survey) within the APE. HRA historian Matthew Sneddon, M.A., assisted with the pedestrian survey portion of the field work, since the pedestrian and subsurface surveys were conducted concurrently. Surface and subsurface survey methods were the same for both the Current and Potential Future Projects areas.

6.2 Surface Survey

HRA archaeologists walked parallel transects spaced less than 20 meters apart across the entire APE. Surface survey was designed to identify cultural resources visible above ground including ditches, artifact scatters, features, and other signs of human landscape use. Representative photographs were taken during the course of the survey in order to document the landscape. Additionally, cultural resources visible on the surface were photographed and GPS points were taken in order to document the location of these resources.

6.3 Subsurface Survey

Shovel probes (SP) were excavated across the APE in order to identify buried cultural resources. Sediments recovered from each SP were screened through ¼-inch hardware mesh. Observations regarding SP sediments were documented on standardized forms. These observations included: sediment grain size (e.g., sand, silt), gravel size and shape, contacts (e.g., abrupt, difuse), color, presence of water, presence of roots, signs of soil development, origin of sediment, and disturbance. Cultural materials recovered during SP excavation were noted. Precontact and historic artifacts, if observed, would have been photographed from multiple angles. Modern and temporally non-diagnostic artifacts were not photographed. GPS points were taken for each SP in order to document their locations. Shovel probe excavation was terminated when impassible objects (e.g., large cobbles, wood) were encountered or when *in situ* (i.e., in place/not disturbed) glacially deposited sediment was encountered.

7. Archaeological and Architectural Inventory Results

7.1 Archaeological Inventory

HRA archaeologists Alexander E. Stevenson, Angus Tierney, and Adam Fruge performed surface and subsurface survey across the APE on May 29, 2013. The results of this survey are discussed below.

7.1.1 Current Project

The portion of the APE for Current Project included a number of subsurface utilities. Fiber optic lines were noted across the length (north-south) of the Current Project area, approximately 20 feet east of the rail alignment, and were approximately 3 feet below surface. A large water line was located approximately 20 feet north of 100th Street Southwest and was noted across the entire width (east-west) of the Current Project area. Tacoma Public Utilities personnel indicated that this waterline was located from 3 to 12 feet below surface.

7.1.1.1 Surface Survey

Surface survey across the Current Project area revealed that much of the landscape had undergone extensive modification (Figure 7-1). Ground surface visibility was good (50–75 percent), however much of the surface sediment appeared to be imported fill. North of 100th Street Southwest, cutting and filling appears to have taken place in order to create suitable locations for access roads and utility roads. Ditches along the railroad alignment were noted, but were not examined intensively because of the concurrent architectural history survey underway at the time (discussed below).

A fence post built with two wooden railroad ties set in the ground near the chain link fence that borders the Burlington Northern Santa Fe (BNSF) property near the track crossing at 100th Street Southwest was observed near the southern end of the Current Project area (Figures 7-2 and 7-3; Appendix A). One tie is driven vertically into the ground and braced by another tie connected at roughly a 45 degree angle. Both ties are treated with creosote, well weathered, and each have a single metal rail tie plate secured with metal spikes. The rusty barbed wire wrapped around the vertical post hangs loosely, as it is no longer connected to another post. It was recorded as cultural isolate 45PI1304.

Figure 7-1. Overview of Current Project area (view south from west of SP4).

Figure 7-2. Railroad Tie Fence Post (45PI1304), vicinity of 4023 100th Street Southwest, view facing north, 2013.

7.1.1.2 Subsurface Survey

A total of seven SPs were excavated within the Current Project area (Figure 7-3). Two shovel probes (SP8 and SP9) were excavated adjacent to the APE because excavation within the APE, less than 25 feet from the main rail line, would have required HRA to have a flagger from Sound Transit, as well as re-compaction of sediments to Sound Transit specifications.

Three basic stratigraphic units were identified within the Current Project area. Dark gray, moderately compact silt with poorly sorted gravels, interpreted as fill, was observed in only two shovel probes (Table 7-1). This gray silt overlaid a dark brown organic sand with some round to subround gravels and included a number of modern and temporally non-diagnostic artifacts including brown bottle glass and metal fragments. This dark brown organic sand was observed across the entire APE, appeared to be highly disturbed, and was interpreted as disturbed glacial outwash. An olive brown medium to coarse sand with poorly sorted round to subround cobbles was observed below the dark brown sand, and was interpreted as *in situ* glacial outwash which had not been disturbed. There was a sharp contact between these two glacially derived sediments and no obvious signs of soil development were noted, indicating relatively recent disturbance of the landscape, likely extensive grading and scraping associated with construction of the railroad alignment.

Shovel probes 1, 2, 3, 5, 7, 8, and 9 yielded cultural materials that were interpreted as modern or temporally non-diagnostic and were recovered from sediment that was previously disturbed (Table 7-1). These temporally non-diagnostic or modern artifacts included brown and clear bottle glass fragments, one ceramic fragment, wire nails, and fragments of shell. No precontact, historic, or temporally diagnostic cultural materials were identified in any of the shovel probes in the Current Project area.

Figure 7-3 Shovel Probe and Fence Post locations.

Table 7-1. Current Project shovel probe results.

SP #	Project	Maximum Depth (cmbs)	Depth (cm): Description – *Comments*	Cultural Materials (depth)
1	Current Project	95	0-20: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	6 clear glass frags (0-20 cmbs)
			20-95: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	None
2	Current Project	110	0-60: Dark brown organic sand,, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	1 wire nail
			60-110: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	None
3	Current Project	90	0-32: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	Modern debris
			32-90: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	None
4	Current Project	77	0-25: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	None
			25-77: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels, some FeO_2 staining at 40 cmbs – *glacial outwash, in situ*	None
5	Current Project	100	0-100: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	Brown glass frags (0-80 cmbs)
6	Current Project	95	0-25: Dark gray silt, moderately compact, poorly sorted rounded to subround gravels – *fill*	None
			25-30: Brown fine to medium sand, grass and roots – recent buried surface	None
			30-80: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	None
			80-95: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	None

SP #	Project	Maximum Depth (cmbs)	Depth (cm): Description – *Comments*	Cultural Materials (depth)
7	Current Project	94	0-15: Dark gray silt, moderately compact, poorly sorted rounded to subround gravels – *fill*	3 brown glass frags, 1 ceramic frag (0-20 cmbs)
			15-62: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	
			62-94: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	
8	Current Project	100	0-100: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	6 shell fragments (30-50 cmbs) 2 wire nails (95 cmbs)
9	Current Project	72	0-72: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	2 brown glass frags, 2 sanitary can frags and carpeting/insulation (50-72 cmbs)

7.1.2 Potential Future Project

The fiber optic lines were observed within the Potential Future Project area of the APE. The lines existed roughly 10–20 feet east of the rail alignment, approximately 3 feet below surface, and were found across the entire length (north/south) of the Potential Future Project area.

7.1.2.1 Surface Survey

The landscape within the Potential Future Project area appears to have undergone less modification than that of the Current Project area. The northern portion of this area was generally flat (Figure 7-4). Ground surface visibility was moderate (roughly 50 percent). The southern portion of this area had been the subject of some modifications, including access road construction, which included some cutting and filling. Ditches along the railroad alignment were noted, but were not examined intensively because of the concurrent architectural history survey underway at the time (discussed below). No archaeological sites were identified during the surface survey portion of this project.

Figure 7-4 Overview of northern portion of Potential Future Project area (view south); note orange paint marking fiber optic line.

7.1.3.1 Subsurface Survey

A total of six shovel probes were excavated within the Potential Future Project area (Figure 7-3). Two basic stratigraphic units were identified across the Potential Future Project area (Table 7-2). These strata corresponded to the two lower stratigraphic units observed in the Current Project area. A dark brown organic sand with some round to subround gravels included a number of modern and temporally non-diagnostic artifacts, including brown and clear bottle glass and unidentifiable metal fragments observed near the surface across the Potential Future Project area. This dark brown organic sand was interpreted as disturbed glacial outwash. An olive brown medium to coarse sand with poorly sorted round to subround cobbles was observed below the dark brown sand and was interpreted as *in situ* glacial outwash which had not been disturbed. There was a sharp contact between these two glacially derived sediments and no obvious signs of soil development were noted, indicating relatively recent disturbance of the landscape, likely extensive grading and scraping associated with construction of the railroad alignment.

Shovel probes 10 and 13 yielded cultural materials that were interpreted as modern or temporally non-diagnostic and were recovered from sediment that was previously disturbed (Table 7-2). These temporally non-diagnostic or modern objects included one wire nail, copper wire, and brown and clear bottle glass fragments. No precontact, historic or temporally diagnostic cultural materials were identified in any of the shovel probes in the Potential Future Project area.

Table 7-2. Potential Future Project shovel probe results

SP #	Project	Maximum Depth (cmbs)	Depth (cm): Description – *Comments*	Cultural Materials (depth)
10	Potential Future Project	76	0-65: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	Wire nail (0-20 cmbs) Copper wire (20 cmbs)
			65-76: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	None
11	Potential Future Project	70	0-30: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	None
			30-70: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	None
12	Potential Future Project	85	0-72: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	None
			72-85: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	None
13	Potential Future Project	75	0-72: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact, terminated on cobbles – *disturbed/fill*	Brown and clear bottle glass fragments throughout
14	Potential Future Project	61	0-61: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact, terminated on cobbles – *disturbed/fill*	None
15	Potential Future Project	60	0-22: Dark brown organic sand, moderately compact, some round to subround gravels, sharp lower contact – *disturbed/fill*	None
			22-60: Olive brown medium to coarse sand, many poorly sorted rounded to subround gravels – *glacial outwash, in situ*	None

7.2 Architectural Inventory

Architectural Historian Matt Sneddon conducted an architectural inventory of the APE on May 29, 2013. Sneddon walked the length of the APE to ensure identification of all potential above ground historical resources.

7.2.1 Current Project

Aside from the NPRR alignment, none of the BSOs 45 years old or older identified in Section 2.2.3 are located in the portion of the APE for the Current Project.

7.2.2 Potential Future Project

In addition to the NPRR alignment, seventeen of the BSOs 45 years old or older identified in Section 2.2.3 are located in the Potential Future Project area. Initial desk research indicated that only one of the seventeen BSOs—a warehouse at 4046 100th Street Southwest owned by Lakes Auto Wrecking—had yet to be recorded (Table 7-3). During the inventory, Sneddon determined that another warehouse in the Lakes Auto Wrecking yard likely met the 45-year-old age criterion, a finding that later research confirmed. Sneddon photographed, recorded, and conducted a condition assessment of the following two BSOs in the project APE (Table 7-3; Figure 7-5).

Table 7-3 Newly recorded BSOs within the Potential Future Project Area.

BSO	Address	Tax Parcel	Build Date
Lakes Auto Wrecking Warehouse #1	4046 100th St SW	0219011113	ca. 1952
Lakes Auto Wrecking Warehouse #2	4046 100th St SW	0219011113	1952

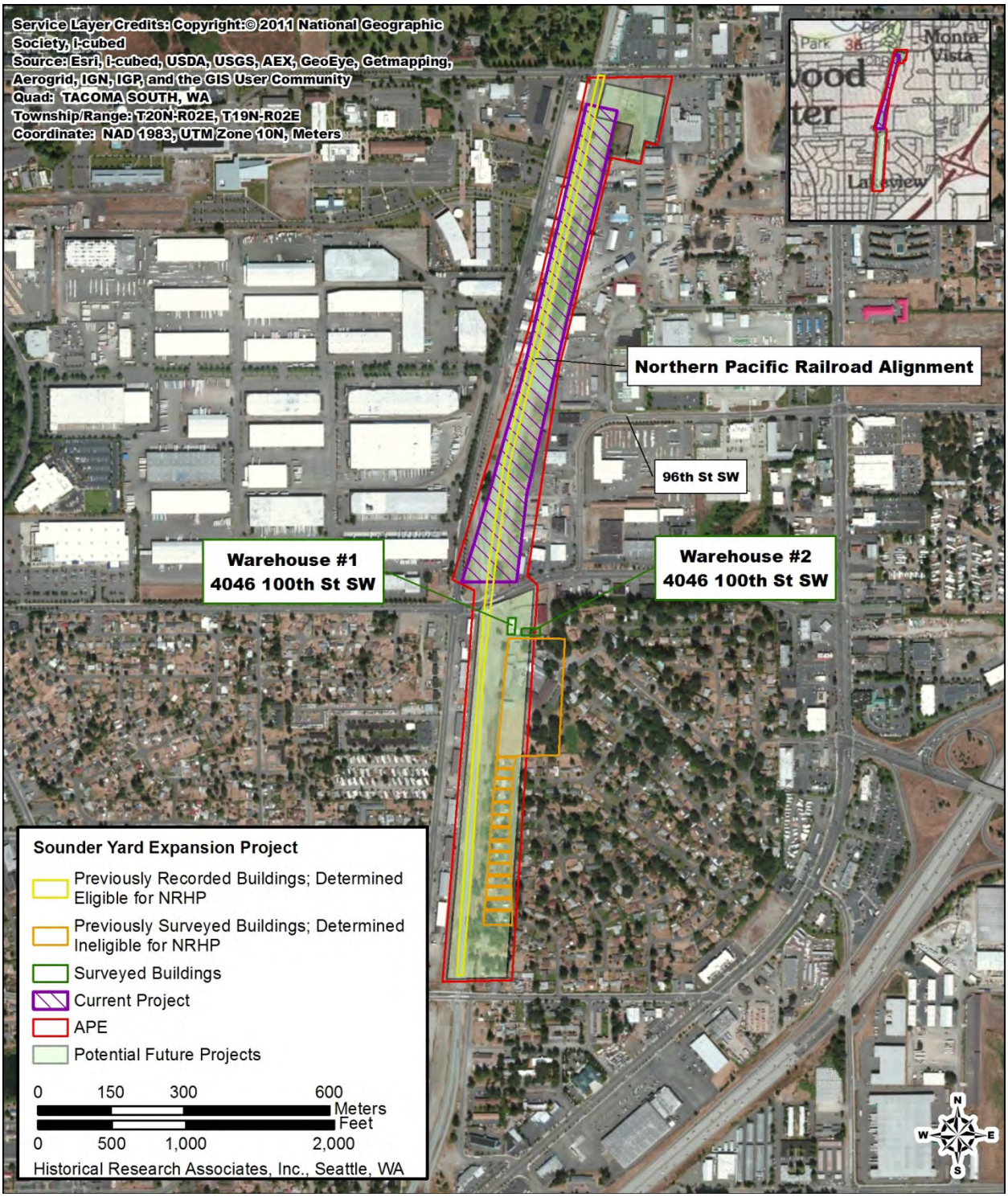

Figure 7-5 New and previously recorded BSOs within the APE.

8. Architectural Evaluation

8.1 Evaluation Criteria

8.1.1 NRHP Criteria for Evaluation

The criteria for evaluating and listing properties in the NRHP require that a historic property be at least 50 years old; possess integrity of location, design, setting, materials, workmanship, feeling, and association; and meet at least one of the following criteria:

A. Property is associated with events that have made a significant contribution to the broad patterns of our history; or

B. Property is associated with the lives of persons significant in our past; or

C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction; or

D. Property has yielded, or is likely to yield, information important in prehistory or history.

Buildings under 50 years of age may be eligible for listing in the NRHP if they are exceptional or rare examples of specific architectural styles, or have exceptional historic significance (U.S. Department of the Interior, National Park Service 1997).

8.1.1.1 Integrity

Historic integrity is a measure of how a property conveys its significance. To retain integrity, a property—or in this case, buildings—must retain several if not all of the seven aspects of integrity, which are as follows:

- Location: the place where the property was constructed or the place where the historic event occurred.
- Design: the combination of elements that create the form, plan, space, structure, and style of a property.
- Setting: the physical environment of a historic property.
- Materials: the physical elements that were combined or deposited during a particular period of time, and in a particular pattern or configuration, to form a historic property.

- Workmanship: the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- Feeling: a property's expression of the aesthetic or historic sense of a particular period of time.
- Association: the direct link between an important historic event or person and a historic property.

8.1.2 Washington Heritage Register

The WHR is an official listing of historically significant sites and properties found throughout the state. The list is maintained by DAHP and includes districts, sites, buildings, structures, and objects that have been identified and documented as being significant in local or state history, architecture, archaeology, engineering or culture. Listing in the WHR is strictly an honorary designation and raises the public awareness about historic and cultural values. To qualify,

A. A building, site, structure or object must be at least 50 years old. If newer, the resource should have documented exceptional significance.

B. The resource should have a high to medium level of integrity, i.e. it should retain important character defining features from its historic period of construction.

C. The resource should have documented historical significance at the local, state or federal level (DAHP 2013b).

8.1.3 Lakewood Landmark

The City of Lakewood municipal code outlines two primary criteria for designating city landmarks (City of Lakewood 2013):

A. An historic resource may be designated as a Lakewood landmark if it is more than fifty years old or, in the case of a landmark district, contains resources that are more than fifty years old, and possesses integrity of location, design, setting, materials, workmanship, feeling and association, and:

- Is associated with events that have made a significant contribution to the broad patterns of national, state or local history; or
- Is associated with the lives of persons significant in national, state or local history; or
- Embodies the distinctive characteristics of a type, period, style or method of design or construction, or that represents a significant and distinguishable entity whose components may lack individual distinction; or

- Has yielded or may be likely to yield information important in prehistory or history; or
- Is an outstanding work of a designer or builder who has made a substantial contribution to the arts.

B. An historic resource may be designated a community landmark because it is an easily identifiable visual feature of a neighborhood or city and contributes to the distinctive quality or identity of such neighborhood or the city or because of its association with a significant historical events or historic themes, association with important or prominent persons in the community or county, or recognition by local citizens for substantial contribution to the neighborhood or community. An improvement or site qualifying for designation solely by virtue of satisfying criteria set out in this section shall be designated a community landmark.

8.2 Evaluations

Because of the similarity of the two warehouses on the Lakes Auto Wrecking property, evaluation of the eligibility of the two structures for the historic registers were combined; however each building has an individual physical descriptions and assessments of integrity.

8.2.1 Lakes Auto Wrecking Warehouse #1

Location: 4046 100th Street Southwest, west edge of lot, Potential Future Project area.

Lakes Auto Wrecking Warehouse #1 (Figure 8-1) is likely incorrectly listed in Pierce County tax parcel records as constructed in 1976. Aerial photographs show a structure in the same configuration and of the same size at this location in 1957 (USGS 1957), and the building's materials appear older than 37 years old. The warehouse is one of three structures in an auto wrecking and repair compound. The single-story, wood-framed warehouse has a rectangular plan of 3,000 square feet with a side gable roof of moderate pitch. The metal roof appears relatively new and has close eaves and verges. West elevation has several multi-light, fixed pane, metal frame windows that are currently painted over or boarded up. Sections of the corrugated metal siding on the west elevation are missing in places, especially on the southwest corner. Two sets of large fixed pane picture windows flank a pedestrian door on the north elevation. The north end is sided with plywood, and three of the four windows are boarded up. The east elevation faces the main yard and has roll up garage doors and a few pedestrian doors. A small shed is attached to the south elevation; fencing and vegetation prevented a closer look at other materials and features.

Figure 8-1. Lakes Auto Wrecking Warehouse #1 oblique, north and west elevations, 2013.

8.2.2 Lakes Auto Wrecking Warehouse #2

Location: 4046 100th Street Southwest, south edge of lot, Potential Future Project area.

Lakes Auto Wrecking Warehouse #2, built in 1952, is one of three structures in an auto wrecking and repair compound. The single-story, wood-framed warehouse has a rectangular plan of 3,240 square feet with a low pitched shed roof (Figure 8-2). The built-up roof has projecting eaves and exposed rafters. Two solid pedestrian doors and a boarded up, metal frame and sash two-light sliding window are interspersed between four metal roll-up garage doors of various sizes that dominate the front, north, elevation. Most of the front elevation is sided with T1-11 except for a strip of unknown material that may cover an original ribbon of fenestration. Signage that reads "Imports & Japanese Engine" is attached to a section of the stripping. Other elevations are solid walls of vertical shiplap wood siding.

Figure 8-2. Lakes Auto Wrecking Warehouse #2 north elevation, 2013.

8.2.2.1 Evaluation

Historic Register Criteria

Pierce County tax parcel records list the construction date of Warehouse #1 as 1976 and Warehouse #2 as 1952. As discussed earlier, Warehouse #1 was likely built at approximately the same time as Warehouse #2. Assuming the construction date of Warehouse #1 is incorrectly recorded, the two warehouses meet the age criteria but fail to qualify under any other criteria for eligibility for the NRHP, WHR, and Lakewood Landmark historic registers. In addition, the warehouses appear to have fair to low integrity.

The warehouses are associated with gravel mining and later, the auto service industry. Gravel mining was an important part of road building projects and concrete production, but a fairly common industry in and around developing urban areas in the twentieth century. A 1951 Washington State mining directory lists 125 sand and gravel operations in Washington, and 12 in the greater Tacoma area alone (Stebbins 1951:14–15, 22). A gravel pit is still in operation approximately 1 mile north of the APE (McClain's Soil Supply 2013). Similarly, automotive service industries including auto wrecking, repair, painting, and car wash have been well represented in Lakewood since the 1960s

(Polk 1960:225–226). The buildings lack any known direct associations with events that have made a significant contribution to the broad patterns of national or local history required for eligibility under NRHP Criterion A, WHR Criterion C, and Lakewood Landmark Criterion A.1; or with the lives of significant persons required for eligibility under NRHP Criterion B, WHR Criterion C, and Lakewood Landmark Criterion A.2. The utilitarian wood-framed warehouses do not embody distinctive characteristics of a type, period, or method of construction or represent the work of a master, or possess high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction required to qualify under NRHP Criterion C and Lakewood Landmark Criteria A.3 and A.5. The warehouses are not likely to yield information important to understanding history or prehistory required for eligibility under NRHP Criterion D and Lakewood Landmark Criterion A.4. The corner location on a busy street may make warehouses a fairly identifiable visual feature in Lakewood, but the buildings do not impart a distinctive quality or identity to the community nor are they associated with significant historical events or historic themes, with important or prominent persons in the community or county, or recognized by local citizens for substantial contribution to the neighborhood or community required for consideration under Lakewood Landmark Criterion B.

Integrity

Warehouse #1 has fair to low integrity. The warehouse's location appears original, but the physical setting has changed since its construction as part of a gravel pit operation. The gravel pit is no longer extant, and 100th Street Southwest was extended through the original property. The area has experienced significant commercial development since the period of initial construction. The building's basic design appears original, although some windows are boarded up and others may have been added later. The condition of the original materials is not known with certainty. The corrugated metal siding and some fenestration appear original; other components such as the metal roof, picture windows are later replacements. Evidence of workmanship is largely limited to basic construction methods of the twentieth century such as nailed wood framing, and mass-produced materials such as pre-cut lumber, nailed and bolted connections, corrugated metal siding, plywood, and metal roofing. The warehouse no longer serves its original purpose, so its integrity of feeling is diminished. The warehouse has no known association with an important historic event or person.

Warehouse #2 also has fair to low integrity. The warehouse's location appears original, but the physical setting has changed since its construction as part of a gravel pit operation. The gravel pit is no longer extant, and 100th Street Southwest was extended through the original property. The area has experienced significant commercial development since the period of initial construction. The building's basic design appears original, although a strip of siding material on the front elevation may cover original fenestration. The condition of the original materials is not known with certainty. The T1-11 siding, roll up garage doors, and roofing are likely later replacements. Evidence of workmanship is largely limited to basic construction methods of the twentieth century such as nailed wood framing, and mass-produced materials such as pre-cut lumber, nailed and bolted connections,

T1-11 siding, and built up roofing materials. The building's siding is a patchwork of different materials. The warehouse no longer serves its original purpose, so its integrity of feeling is diminished. The warehouse has no known association with an important historic event or person.

8.3 Adverse Effects Assessment

The Section 106 process requires an assessment of the potential effect an undertaking or project may have on historically significant properties. There is only one historically significant property within the APE. It is a section of the NPRR alignment that was determined eligible for the NRHP in 2010 under Criterion A "for the profound influence the rail line had in economic and residential development in the Pacific Northwest," and under Criterion B for its associations with E. S. "Skookum" Smith, a NPRR engineer (Chasteen 2008:4). The eligibility was limited to the alignment rather than the physical equipment, which had been routinely replaced since the original period of construction (Chasteen 2008:4–5).

The Public Land Survey System data listed for the Northern Pacific rail alignment in the HPI does not specifically include all of the area covered by the APE (the track alignment in S1, T19N, R2E, is not listed in the HPI). Because this appears to be an omission, HRA assumes that since sections immediately to the south and north of the APE are eligible, the connecting segment (S1, T19N, R2E) between S12, T19N, R2E and S36, T20N, R2E (listed segments) is also eligible.

The Current and Potential Future Projects do not constitute an adverse effect on a historic property because the proposed construction will not alter the integrity of the railroad alignment. Although the character-defining features and integrity of the existing rail alignment are not specifically detailed in the HPI, the third track; roadway, drainage, and lighting updates; temporary buildings; and parking proposed under the Current Project construction plan, and the maintenance shop, additional yard tracks, and washing facility to follow under the Potential Future Project maintain the existing track and rail alignment, and preserve its historic function as an operational rail line. In the case of a historic rail alignment—not the rail line itself—not all of the standard criteria of a potential adverse integrity assessment apply. Without physical equipment, evaluation of original materials, design, and feeling are problematic or not possible. The basic alignment grade or design, original alignment location, and association with the Northern Pacific Prairie Line and E. S. Smith will be unaffected by the Project. The immediate setting on the railroad right-of-way is consistent with the period of original construction, although substantial changes in land use on either side have occurred since the early twentieth century. The Current and Potential Future Projects will add some support structures that are visually consistent with the many warehouses and commercial buildings along this section.

9. Summary and Recommendations

9.1 Archaeological Resources

One cultural isolate (45PI1304) was observed and recorded during this cultural resources survey within the Current Project portion of the APE. No archaeological resources were observed within the Potential Future Project portion of the APE. Sediments observed during subsurface survey in both the Current and Potential Future Project areas were: 1) highly disturbed and represented no potential contain significant undisturbed archaeological deposits or 2) were glacially deposited and therefore had no potential to contain archaeological deposits.

The cultural isolate, a fence post, is very common and is not considered to be historically significant. As a result, it will not be adversely affected by the project. HRA recommends no further archaeological survey work take place for the Sounder Yard Expansion Project unless the project undergoes substantial design changes and expands beyond the currently APE.

9.2 Architectural Resources

HRA identified eighteen BSOs in the Potential Future Project APE; sixteen of the eighteen had been previously recorded and determined ineligible for the NRHP and WHR by DAHP. HRA surveyed and evaluated the two previously unrecorded BSOs consisting of two warehouses on the Lakes Auto Wrecking property at 4046 100th Street Southwest. HRA recommends that neither of the two BSOs is eligible for the NRHP, WHR, or Lakewood Landmark register.

In addition, HRA evaluated the Project's potential to adversely affect the historic NPRR alignment, an NRHP eligible property located within the APE (DAHP 2010). HRA recommends that the Project will not pose an adverse effect to the NPRR alignment. HRA updated the current HPI for the alignment to include the Public Land Survey System information for the project area. No further action is required for architectural resources in the APE. If the Project undergoes substantial design changes and expands beyond the current APE, further architectural study may become necessary.

9.3 Accidental Discovery of Archaeological Resources

In the event that archaeological deposits are inadvertently discovered during construction in any portion of the APE, ground-disturbing activities in the vicinity of the find should be halted immediately, and Sound Transit should be notified immediately. Sound Transit will contact DAHP, as well as other agencies and affected Tribes, as appropriate.

9.4 Discovery of Human Remains

Any human remains that are discovered during construction of the Project will be treated with dignity and respect.

If ground-disturbing activities encounter human skeletal remains during the course of construction, then all activity that may cause further disturbance to those remains **must** cease, and the area of the find must be secured and protected from further disturbance. In addition, the finding of human skeletal remains **must** be reported to the county coroner **and** local law enforcement in the most expeditious manner possible. The remains should not be touched, moved, or further disturbed.

The county coroner will assume jurisdiction over the human skeletal remains, and make a determination of whether those remains are forensic or non-forensic. If the county coroner determines the remains are non-forensic, they will report that finding to the DAHP. DAHP will then take jurisdiction over those remains and report them to the appropriate cemeteries and affected tribes. The State Physical Anthropologist will make a determination of whether the remains are Indian or non-Indian, and report that finding to any appropriate cemeteries and the affected tribes. The DAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

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Appendix A: Cultural Isolate

STATE OF WASHINGTON
ARCHAEOLOGICAL ISOLATE INVENTORY FORM

Smithsonian Number:
45PI1304
***County:** Pierce

***Date:** 6/10/13 ***Compiler:** Alexander Stevenson and Matthew Sneddon

ISOLATE DESIGNATION

Isolate Name: Fence Post

Field/ Temporary ID: HRA-2082-1

***Site Type:** Historic Isolate

ISOLATE LOCATION

***USGS Quad Map Name:** Tacoma South

***Legal Description: T**20 N **R 2 E/W:** E **Section(s): 36**

Quarter Section(s): SE

***UTM: Zone** 10 **Easting** 538539 **Northing** 5224327

Latitude: 47.171326 **Longitude:** -122.491451 **Elevation (FT/M):**

Other Maps: none **Type:** n/a

Scale: n/a **Source:** n/a

Drainage, Major: none **Drainage, Minor:** Chambers Creek **River Mile:** none

Aspect: none **Slope:** 0

***Location Description:** This isolate is located in Pierce County Washington within the city limits of Lakewood on property owned by Sound Transit. The site is roughly 200 feet north of 100th Street Southwest and approximately 100 feet east of the Sound Transit rail alignment.

Approach *(For Relocation Purposes)***:** Starting in Tacoma proceed 6.2 miles on Interstate 5 (I-5) south. Take exit 127 for South Tacoma Way, proceed on the off ramp for roughly 0.4 miles. Merge onto Washington State Highway 512 (WA-512) westbound. Proceed for approximately 200 feet on WA-512 westbound and turn right (north) onto South Tacoma Way. Proceed on South Tacoma Way for 0.2 miles. Turn left (west) onto 100th Street Southwest. Drive on 100th Street Southwest for 0.4 miles. Park and walk north of 100th Street Southwest approximately 200 feet to the isolate.

ISOLATE DESCRIPTION

***Narrative Description:** The site consists of a fence post built with two wooden railroad ties set in the ground near the chain link fence that borders the Burlington Northern Santa Fe (BNSF) property near the track crossing at 100th Street Southwest (Figures 1 and 2). One tie is driven vertically into the ground and braced by another tie connected at roughly a 45 degree angle. Both ties are treated with creosote, well weathered, and each have a single metal rail tie plate secured with metal spikes. The rusty barbed wire wrapped around the vertical post hangs loosely as it is no longer connected to another post.

Vegetation** *(On Site):** grasses

Local: **Regional:**

Landforms *(On Site)***:** Glacial upland **Local:**

Water Resources *(Type)***:** Chambers Creek **Distance:** 0.64 mi (1.0 km) **Permanence:** permanent

***Method of Collection(s):** None

Location of Artifacts** *(Temporary/Permanent):** n/a

ISOLATE AGE

***Component:** Historic ***Dates:** pre-1950 ***Dating Method:** observation

Phase: n/a **Basis for Phase Designation:** observation

ISOLATE RECORDERS

Observed by: Matthew Sneddon

Address: 1904 Third Avenue, Suite 240, Seattle WA 98101

***Date Recorded:** 5/29/13

Recorded by** *(Professional Archaeologist):** Alexander Stevenson

***Affiliation:** Historical Research Associates ***Affiliation Phone Number:** 206-343-0226

***Affiliation Address:** 1904 Third Avenue, Suite 240, Seattle WA 98101

***Affiliation E-mail:** astevenson@hrassoc.com

Date Revisited: n/a **Revisited By:** n/a

ISOLATE HISTORY

Previous Work *(Done on Area Where Isolate was Found)***:** none

LAND OWNERSHIP

***Owner:** Sound Transit

***Address:** 401 South Jackson Street, Seattle, WA 98104

***Tax Lot/ Parcel No: 5215001570**

RESEARCH REFERENCES

Items/Documents Used In Research** *(Specify):**

USGS MAP

***Quad Name:** Tacoma South

***Series:** 7.5 minute

***Date:** 2011

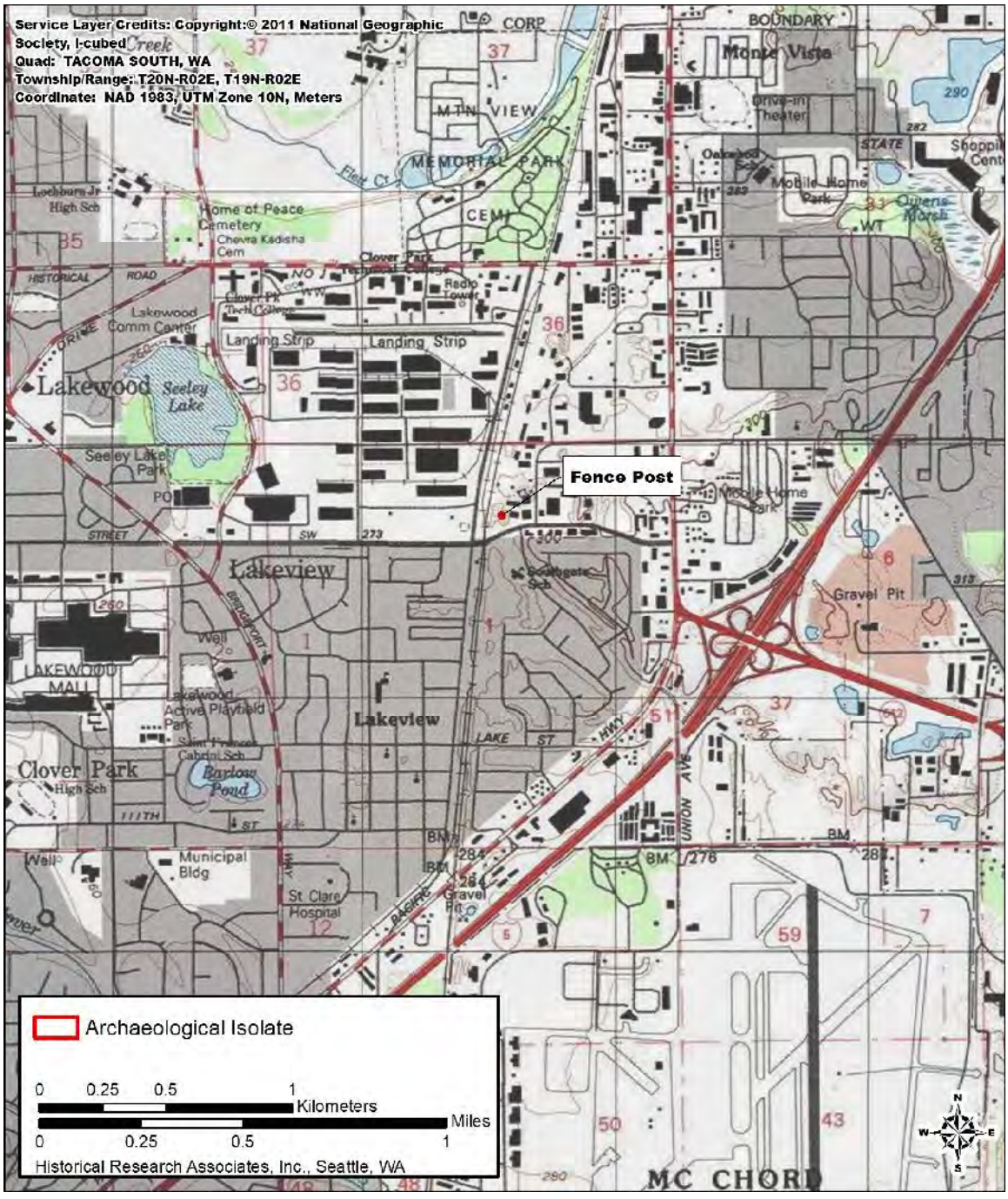

Figure 1. Fence post location

PHOTOGRAPH(S)

***Photograph Description(s):**

Figure 2. Fence post

Appendix B: Historic Property Inventory Forms

Historic Inventory Report

Location

Field Site No. **DAHP No.**

Historic Name:

Common Name: 4046 100th Street SW Warehouse 1

Property Address: 4046 100th SW, Lakewood, WA 98499

Comments:

Tax No./Parcel No. 0219011113

Plat/Block/Lot

Acreage 1.96

Supplemental Map(s)

Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	County	Quadrangle
T19R02E	01			Pierce	TACOMA SOUTH

Coordinate Reference

Easting: 1144890

Northing: 674752

Projection: Washington State Plane South

Datum: HARN (feet)

Identification

Survey Name: Sounder Lakewood Yard Expansion Project **Date Recorded:** 05/29/2013

Field Recorder: M. Sneddon

Owner's Name: Lakes Auto Wrecking

Owner Address: 4046 100th Street SW

City: Lakewood **State:** WA **Zip:** 98499

Classification: Building

Resource Status: **Comments:**
Survey/Inventory

Within a District? No

Contributing? No

National Register:

Local District:

National Register District/Thematic Nomination Name:

Eligibility Status: Not Determined - SHPO

Determination Date: 1/1/0001

Determination Comments:

Historic Inventory Report

Description

Historic Use: Commerce/Trade - Warehouse
Current Use: Commerce/Trade - Warehouse
Plan: Rectangle
Stories: 1
Structural System: Balloon Frame
Changes to Plan: Intact
Changes to Interior: Unknown
Changes to Original Cladding: Unknown
Changes to Windows: Moderate
Changes to Other: Unknown
Other (specify):

Style:	Cladding:	Roof Type:	Roof Material:
Other - Utilitarian	Metal - Corrugated	Gable - Side Gable	Metal - Standing Seam

Foundation:	Form/Type:
Concrete - Poured	Utilitarian

Narrative

Study Unit
None

Other

Date of Construction: 1952 Built Date

Builder:
Engineer:
Architect:

Property appears to meet criteria for the National Register of Historic Places: No
Property is located in a potential historic district (National and/or local): No
Property potentially contributes to a historic district (National and/or local): No

Statement of Significance:

Lakes Auto Wrecking Warehouse #1 is likely incorrectly listed in Pierce County tax parcel records as constructed in 1976. Aerial photographs show a structure at this location in 1957 (USGS 1957) in the same configuration and size, and the building's materials appear older than 38 years old. Warehouse #1 was likely built in conjunction with Warehouse #2 in 1952 by the Harrison Brothers Company, a contracting company that operated a gravel pit located on the original, much larger property (Pierce County 2013; Metsker 1960). The warehouse was likely associated with gravel mining and later, the auto service industry. Gravel mining was an important part of road building projects and concrete production, but a fairly common industry in and around developing urban areas in the twentieth century. A 1951 Washington State mining directory lists 125 sand and gravel operations in Washington, and 12 in the greater Tacoma area alone (Stebbins 1951:14-15, 22). A gravel pit is still in operation approximately 1.5-miles north of the Lakes Auto Wrecking property (McClain's Soil Supply 2013). Similarly, automotive service industries including auto wrecking, repair, painting, and car wash have been well represented in Lakewood since the 1960s (Polk 1960:225-26). The buildings lack any known direct associations with events that have made a significant contribution to the broad patterns of national or local history required for eligibility under NRHP Criterion A and WHR Criterion C; or with the lives of significant persons required for eligibility under NRHP Criterion B and WHR Criterion C. The utilitarian wood-framed warehouses do not embody distinctive characteristics of a type, period, or method of construction or represent the work of a master, or possess high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction required to qualify under NRHP Criterion C. The warehouses are not likely to yield information important to understanding history or prehistory required for eligibility under NRHP Criterion D.

Description of Physical Appearance:

Lakes Auto Wrecking Warehouse #1 is one of three structures in an auto wrecking and repair compound. The single-story, wood-framed warehouse has a rectangular plan of 3,000 square feet with a side gable roof of moderate pitch. The metal roof appears relatively new and has close eaves and verges. West elevation has several multi-light, fixed pane, metal frame windows that are currently painted over or boarded up. Sections of the corrugated metal siding on the west elevation are missing in places, especially on the southwest corner. Two sets of large fixed pane picture windows flank a pedestrian door on the north elevation. The north end is sided with plywood, and three of the four windows are boarded up. The east elevation faces the main yard and has roll up garage doors and a few pedestrian doors. A small shed is attached to the south elevation; fencing and vegetation prevented a closer look at other materials and features.

Major Bibliographic References:

Dunkelberger, Steve and Walter Neary. Lakewood: Images of America. Charleston, SC: Arcadia, 2005.

McClain's Soil Supply. McClain's Soil Supply Location, electronic resource, http://www.mcclainssoilsupply.com/, accessed June 4, 2013.

Pierce County. Pierce County Geographic Information System. Tax Parcel 0219011113 (Lakes Auto Wrecking), electronic resource, http://matterhorn3.co.pierce.wa.us/publicgis/, accessed June 2, 2013.

Polk, R.L. Polk's Tacoma Suburban Directory. Monterey Park, California: R.L. Polk & Co. Publishers, 1960.

Stebbins, Robert H. Directory of Washington Mining Operations, 1951. Olympia, Washington: Department of Conservation and Development, Division of Mines and Geology, 1951.

United States Department of the Interior, National Park Service. How to Apply the National Register Criteria for Evaluation. rev. ed. Washington, D.C: US Department of the Interior, 1997.

US Geological Survey (USGS). 1941 Aerial photograph AR1S00000040181. Electronic resource, http://earthexplorer.usgs.gov/, accessed May 27, 2013.

_____. 1957 Aerial photograph ARA550460010085. Electronic resource, http://earthexplorer.usgs.gov/, accessed May 27, 2013.

_____.1968 Aerial photograph AR1VCBA00020243. Electronic resource, http://earthexplorer.usgs.gov/, accessed May 27, 2013.

Photos

Warehouse 1, oblique of north and west elevations
2013

Warehouse 1, north elevation
2013

Historic Inventory Report

Location

Field Site No. **DAHP No.**

Historic Name:

Common Name: 4046 100th Street SW Warehouse 2

Property Address: 4046b 100th St SW, Lakewood, WA 98499

Comments:

Tax No./Parcel No. 0219011113

Plat/Block/Lot

Acreage 1.96

Supplemental Map(s)

Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	County	Quadrangle
T19R02E	01			Pierce	TACOMA SOUTH

Coordinate Reference

Easting: 1144947

Northing: 674694

Projection: Washington State Plane South

Datum: HARN (feet)

Identification

Survey Name: Sounder Lakewood Yard Expansion Project **Date Recorded:** 05/29/2013

Field Recorder: M. Sneddon

Owner's Name: Lakes Auto Wrecking

Owner Address: 4046 100th Street SW

City: Lakewood **State:** WA **Zip:** 98499

Classification: Building

Resource Status: **Comments:**
Survey/Inventory

Within a District? No

Contributing? No

National Register:

Local District:

National Register District/Thematic Nomination Name:

Eligibility Status: Not Determined - SHPO

Determination Date: 1/1/0001

Determination Comments:

Historic Inventory Report

Description

Historic Use: Commerce/Trade - Warehouse

Current Use: Commerce/Trade - Warehouse

Plan: Rectangle

Stories: 1

Structural System: Balloon Frame

Changes to Plan: Intact

Changes to Interior: Unknown

Changes to Original Cladding: Moderate

Changes to Windows: Unknown

Changes to Other: Unknown

Other (specify):

Style:	Cladding:	Roof Type:	Roof Material:
Other - Utilitarian	Wood - T 1-11	Shed	Asphalt / Composition - Built Up

Foundation:	Form/Type:
Concrete - Poured	Utilitarian

Narrative

Study Unit

None

Other

Date of Construction: 1952 Built Date

Builder:

Engineer:

Architect:

Property appears to meet criteria for the National Register of Historic Places: No

Property is located in a potential historic district (National and/or local): No

Property potentially contributes to a historic district (National and/or local): No

Statement of Significance:

Warehouse #2 was built in 1952, likely by the Harrison Brothers Company, a contracting company that operated a gravel pit located on the original, much larger property (Pierce County 2013; Metsker 1960). The warehouse was likely associated with gravel mining and later, the auto service industry. Gravel mining was an important part of road building projects and concrete production, but a fairly common industry in and around developing urban areas in the twentieth century. A 1951 Washington State mining directory lists 125 sand and gravel operations in Washington, and 12 in the greater Tacoma area alone (Stebbins 1951:14-15, 22). A gravel pit is still in operation approximately 1.5-miles north of the Lakes Auto Wrecking property (McClain's Soil Supply 2013). Similarly, automotive service industries including auto wrecking, repair, painting, and car wash have been well represented in Lakewood since the 1960s (Polk 1960:225-26). The buildings lack any known direct associations with events that have made a significant contribution to the broad patterns of national or local history required for eligibility under NRHP Criterion A and WHR Criterion C; or with the lives of significant persons required for eligibility under NRHP Criterion B and WHR Criterion C. The utilitarian wood-framed warehouses do not embody distinctive characteristics of a type, period, or method of construction or represent the work of a master, or possess high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction required to qualify under NRHP Criterion C. The warehouses are not likely to yield information important to understanding history or prehistory required for eligibility under NRHP Criterion D.

Description of Physical Appearance:

Lakes Auto Wrecking Warehouse #2, built in 1952, is one of three structures in an auto wrecking and repair compound. The single-story, wood-framed warehouse has a rectangular plan of 3,240 square feet with a low pitched shed roof. The built-up roof has projecting eaves and exposed rafters. Two solid pedestrian doors and a boarded up, metal frame and sash two-light sliding window are interspersed between four metal roll-up garage doors of various sizes that dominate the front, north, elevation. Most of the front elevation is sided with T1-11 except for a strip of unknown material that may cover an original ribbon of fenestration. Signage that reads "Imports & Japanese Engine" is attached to a section of the stripping. Other elevations are solid walls of vertical shiplap wood siding.

Major Bibliographic References:

Dunkelberger, Steve and Walter Neary. Lakewood: Images of America. Charleston, SC: Arcadia, 2005.

McClain's Soil Supply. McClain's Soil Supply Location, electronic resource, http://www.mcclainssoilsupply.com/, accessed June 4, 2013.
Pierce County. Pierce County Geographic Information System. Tax Parcel 0219011113 (Lakes Auto Wrecking), electronic resource, http://matterhorn3.co.pierce.wa.us/publicgis/, accessed June 2, 2013.
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Stebbins, Robert H. Directory of Washington Mining Operations, 1951. Olympia, Washington: Department of Conservation and Development, Division of Mines and Geology, 1951.
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US Geological Survey (USGS). 1941 Aerial photograph AR1S00000040181. Electronic resource, http://earthexplorer.usgs.gov/, accessed May 27, 2013.
_____. 1957 Aerial photograph ARA550460010085. Electronic resource, http://earthexplorer.usgs.gov/, accessed May 27, 2013.
_____.1968 Aerial photograph AR1VCBA00020243. Electronic resource, http://earthexplorer.usgs.gov/, accessed May 27, 2013.

Photos

4046 100th Street SW Warehouse 2, north elevation
2013

Attachment C
Sounder Yard Expansion Noise and Vibration Technical Report

Sounder Yard Expansion Project

Noise and Vibration Technical Report

August 2013

Prepared for:

401 South Jackson Street
Seattle, Washington 98104

Prepared by:

PARSONS BRINCKERHOFF

999 Third Avenue, Suite 3200
Seattle, Washington 98104

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Acronyms and Abbreviations

ANSI – American National Standards Institute

APTA – American Public Transit Association

BNSF – Burlington Northern Santa Fe Railroad

dBA – A-weighted decibels

EIS – Environmental Impact Statement

EPA – United State Environmental Protection Agency

FRA – Federal Railroad Administration

FTA – Federal Transit Administration

ips – inches per second

L_{eq} – equivalent sound level

L_{dn} – day/night sound level

L_{max} – maximum noise levels

mph – miles per hour

NEPA – National Environmental Policy Act

RMS – root mean square

SEPA – State Environmental Policy Act

SW – southwest

VdB – vibration velocity expressed in decibel units

WAC – Washington Administrative Code

Chapter 1—Summary

The analysis of noise impacts in the Sounder Yard Expansion Project is based on a comparison of noise caused by the project with existing noise levels and Federal Transit Administration (FTA) impact levels to determine if a substantial noise increase would result. Construction noise impacts are described based on maximum noise levels of construction equipment published by the U.S. Environmental Protection Agency (EPA). Train noise exposure is predicted at sensitive receptors based on projected operations using the FTA noise assessment spreadsheet model. Mitigation measures are discussed, where appropriate, to avoid or reduce potential noise impacts.

Sound Transit is proposing to expand the existing Lakewood Yard from two to three layover tracks. Currently five, seven-car trains are stored at the yard. The new layover track would increase the storage of the Lakewood Yard to allow for seven, eight-car train sets with standby power outlets on the yard site. Additional improvements include the addition of train and engine crew facility trailer(s), parking, and improvements in access roads, site lighting security system, and drainage facilities.

The noise impact analysis for the Sounder Yard Expansion Project considered all project improvements with focus on train storage operations from each of the two turnout locations to the proposed third layover/storage track. All revenue service trips from Seattle to Lakewood and all non-revenue trips between Lakewood and the Sounder Yard were evaluated in previous assessments in the study area (Sound Transit, 2002, 2005, 2009, 2011).

Potentially noise-sensitive land uses and vibration-sensitive buildings were identified by reviewing previous noise and vibration studies that included the Sounder Yard Expansion Project study area. Noise levels were measured at multiple locations near the proposed yard improvements to establish the existing noise environment. Predicted future noise levels in the study area are based on measured levels conducted as a part of this study and future daily rail operations (Sound Transit, 2013).

Noise levels in the project area are typical of an urban area located near an existing rail corridor. Project noise exposures that would result from the Sounder Yard Expansion Project were modeled at noise-sensitive uses closest to the project alignment. Vibration impacts expected from the project area were determined using Chapter 10: General Vibration Assessment information and procedures contained in the FTA's guidance manual, *Transit Noise and Vibration Impact Assessment* (FTA, 2006).

Substantial transportation-related noise already exists in the project area, including noise from train and vehicular traffic, as well as aircraft flying to and from Joint Base Lewis-McCord

and the Clover Park Vocational Technical School Airport. As a result of the project, future changes in noise levels are predicted to range from no change in existing noise levels to an increase of 1 dBA at nearby residences and at Southgate Elementary School. Future noise levels are predicted to increase by 2 dBA at Clover Park Technical College as a result of the proposed project. Predicted future noise level increases would occur between 4 a.m. and 7 a.m. and between 5 p.m. and 8 p.m. based on the operation schedule. The frequency of noise peaks (L_{max} noise levels) could increase as transit operations increase in the project area.

Noise exposure from the project would range between 45 and 58 dBA day-night sound level (L_{dn})/L_{eq} at the modeled noise-sensitive land uses. Based on FTA criteria, noise impacts are not predicted to occur at noise-sensitive locations evaluated for the project.

Construction activities would generate temporary noise and vibration during the construction period. Maximum (peak) noise levels from construction equipment would range from 69 to 93 dBA at 50 feet. Construction noise at locations farther away would decrease at a rate of 6 dBA per doubling of distance from the source. Because various equipment would be turned off, idling, or operating at less than full power at any time and because construction machinery is typically used to complete short-term tasks at any given location, average L_{eq} noise levels during the day would be less than the maximum noise levels and within City of Lakewood construction noise limits.

Temporary and intermittent ground-borne vibration could be an annoyance to occupants of nearby buildings during construction activities associated with the project; however, vibration-sensitive uses and vibration-sensitive structures were not identified within the immediate project area. Therefore, no substantial construction vibration impacts and no building damage are expected to occur as a result of the project.

Chapter 2—Introduction and Project Description

Introduction

The Federal Transit Administration (FTA) is the federal project lead and the Central Puget Sound Regional Transit Authority (Sound Transit) is the state lead agency for the project.

This technical report has been prepared in support of the Sounder Yard Expansion Project Documented Categorical Exclusion (DCE) in accordance with the National Environmental Policy Act (NEPA), State Environmental Policy Act (SEPA), and the Federal Railroad Administration (FRA)'s Procedures for Considering Environmental Impacts (64 *Federal Register* 28550).

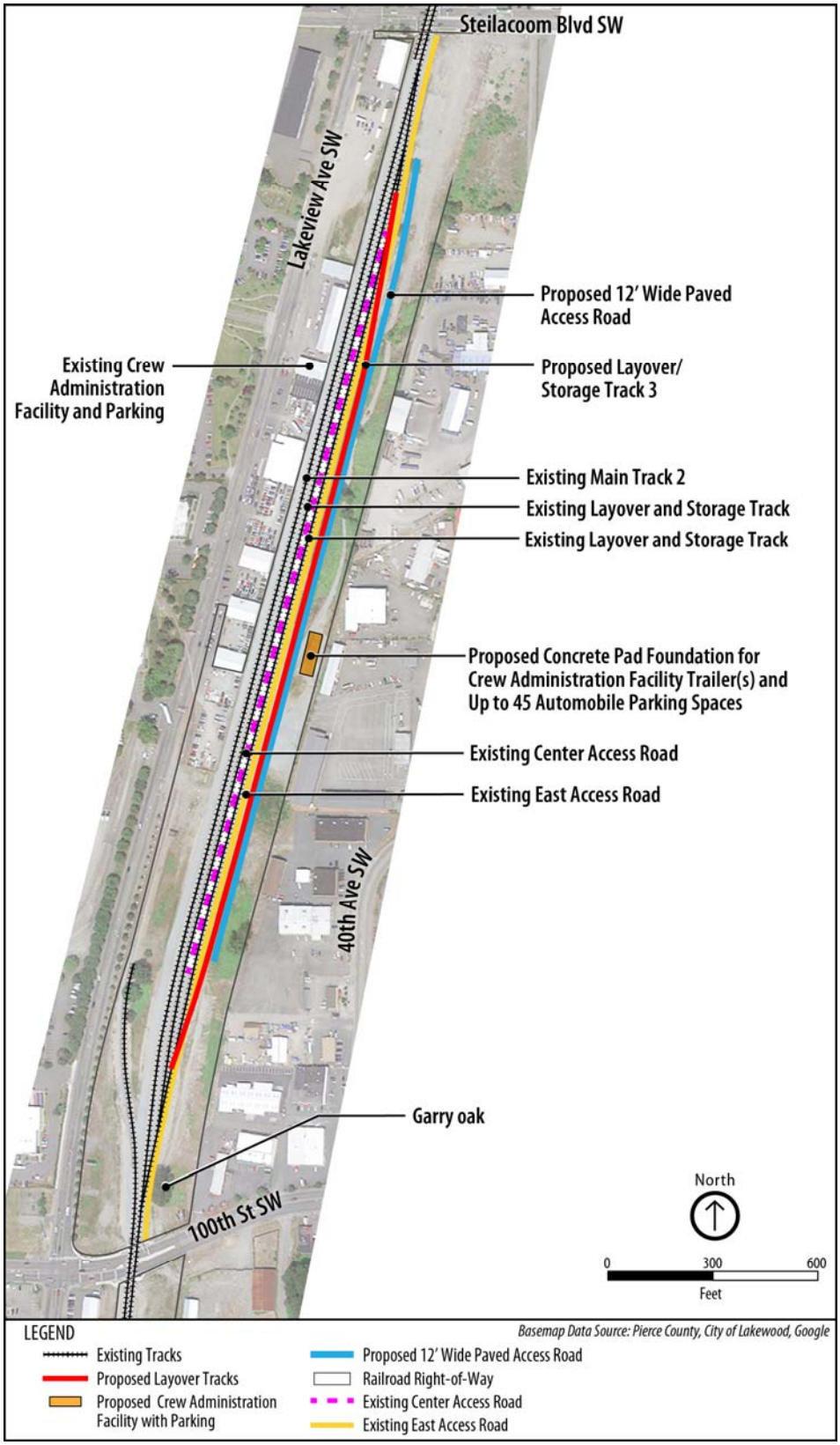
Project Description

The proposed project is located in the City of Lakewood (Exhibit 1) along an approximately 21-mile existing railroad corridor owned by Sound Transit, and Burlington Northern Santa Fe Railroad (BNSF). Project improvements are limited to an area approximately 3,000 feet in length and located exclusively within existing right-of-way. The northern limit of the project is approximately 300 feet south of the crossing at Steilacoom Boulevard SW. The southern project limits are roughly 500 feet north of the railroad crossing at 100th Street SW, as shown on Exhibit 2.

Sound Transit is proposing to expand the existing Lakewood Yard from two to three layover tracks. Currently five, seven-car train sets are stored at the yard. The new layover track would increase the storage of the Lakewood Yard to allow for the storage of seven, eight-car train sets with standby power outlets on the yard site. Crew administration facility trailer(s) would be added along the east side of the new layover track along with up to 45 automobile parking spaces (Exhibit 2) that would replace and provide more staff capacity than the existing crew administration facility currently located west of the Lakewood Yard site. The existing crew administration facility employs an estimated 20 staff, depending on need. Observations of exiting parking indicate that the existing crew administration facility provides up to 25 parking spaces. The existing yard roadways, site lighting security system, and drainage facilities would be updated as described below.

Exhibit 1: Project Vicinity Map

Exhibit 2: Site Vicinity Map


Steilacoom Blvd SW
Lakeview Ave SW
Proposed 12' Wide Paved Access Road
Existing Crew Administration Facility and Parking
Proposed Layover/ Storage Track 3
Existing Main Track 2
Existing Layover and Storage Track
Existing Layover and Storage Track
Proposed Concrete Pad Foundation for Crew Administration Facility Trailer(s) and Up to 45 Automobile Parking Spaces
Existing Center Access Road
Existing East Access Road
40th Ave SW
Garry oak
100th St SW
North
0
300
600
Feet
LEGEND
Basemap Data Source: Pierce County, City of Lakewood, Google
Existing Tracks
Proposed Layover Tracks
Proposed Crew Administration Facility with Parking
Proposed 12' Wide Paved Access Road
Railroad Right-of-Way
Existing Center Access Road
Existing East Access Road

Project Elements—Physical Improvements

- Third layover/storage track and turnouts at each end of the layover yard
- Trailer(s) with approximately 3,200 square feet of space for crew administration
- Concrete pad foundation for trailer(s)
- Up to 45 automobile parking spaces
- Retaining walls if required
- Air lines and air compressor building
- Standby power along tracks
- New access road along the east side of the new storage tracks
- Sewage dump station
- Site lighting for access road and parking area
- Filling of the existing water quality/infiltration ditches to provide appropriate track bedding for new tracks and replacing drainage function with new water quality/infiltration ditches east of the proposed access road
- Paving the remainder of the existing Center Access Road and existing East Access Road

Sound Transit would also conduct geotechnical explorations within the right of way to support design and engineering activities. Soil exploration would consist of test pit holes approximately 5 feet to 10 feet deep for infiltration testing. At least four test pits would occur along the length of the third track, with the addition of one at the proposed parking lot and one at the proposed crew administration facility site.

Project Elements—Service-related Notes

- Project elements provide no new train service and no modifications to crossings or warning devices.
- Noise generated by all existing train service, including wayside horn noise at 100th Street SW and Steilacoom Boulevard SW, was previously evaluated as part of the Lakewood-to-Tacoma Commuter Rail and SR-512 Park-and-Ride Lot Expansion Final EIS (Sound Transit, 2002), the SEPA Addendum to the Lakewood-to-Tacoma Commuter Rail and SR-512 Park-and-Ride Lot Expansion Final EIS (Sound Transit, 2005), Seattle to Tacoma Sounder Commuter Rail Easements and Improvements (Easements 1 and 2) NEPA DCE (Sound Transit, 2009), and Seattle to Tacoma Sounder Commuter Rail Easements and Improvements (Easements 3 and 4) NEPA DCE (Sound Transit, 2011) .
- Train storage movements onto the new third layover/storage track would occur near the beginning or end of each service day.
- Train movements in the storage yard are restricted to 10 miles per hour (mph).

Service Considerations

The rail line that operates in conjunction with the Lakewood layover tracks hosts daily service from both freight and commuter trains. Two daily freight trains operate on this route, along with up to 9 Sound Transit *Sounder* commuter rail round trips. Sound Transit recently extended service south from Tacoma to its Lakewood Station at 11124 Pacific Highway SW. This extension included the construction of a new rail line connecting existing rail line segments at East D Street and South M Street in South Tacoma on previously abandoned rail right-of-way; no freight train service is planned over this new connection. Five of the 9 *Sounder* round trips go all the way to Lakewood.

Once it is fully functional, Sound Transit will operate up to 9 *Sounder* round trips per day between Tacoma Dome Station in Tacoma and its Lakewood Station. Those same *Sounder* trains will also move without passengers (deadhead movements described previously) between the Lakewood Station and the layover yard along Lakeview Avenue SW between 100th Street SW and Steilacoom Boulevard SW in Lakewood.

Amtrak is planning to relocate service from its existing route along BNSF's Point Defiance alignment to the Sound Transit/BNSF corridor, carrying up to 7 new commuter rail trains (6 Amtrak *Cascades* and 1 Amtrak *Coast Starlights*) through the existing mainline corridor that runs parallel to Sound Transit's Lakewood layover track.

Potential Future Improvements

Sound Transit is also considering construction and operation of a maintenance facility and additional yard tracks at this location, although a determination to proceed with these future improvements has not been made at this time. The Sounder Yard Expansion Project has independent utility from the potential future maintenance facility project. Additional storage is needed whether or not the maintenance facility is constructed at this location or at all. If constructed at another location, storage tracks at this location remain useful and the storage tracks would not preclude consideration of alternative sites for a maintenance facility.

Chapter 3—Methodology and Approach

Per FRA's *Guidance on Assessing Noise and Vibration Impacts* (FRA, 2011), FRA relies upon the FTA noise and vibration impact assessment procedures for assessing improvements to conventional passenger rail lines and stationary rail facilities and horn noise assessment.

Noise Assessment Methodology

Predicted noise levels in the area surrounding the project were modeled with the current (2007 version) FTA noise spreadsheet model. Predicted future noise levels in the project area were based on measured sound levels and future daily rail operations outlined in Chapter 1. The spreadsheet was developed by FTA and uses the methods and formulas described in Chapter 6: Detailed Noise Analysis of the FTA guidance manual, *Transit Noise and Vibration Impact Assessment, Final Report* (FTA, 2006).

Noise impacts from rail operations are generated from the interaction of wheels on track and motive power. The interaction of steel wheels on rails generates four different types of noise, depending on track work:

- Noise generated by passing trains operating on tangent track sections
- Noise generated from wheel squeal on tightly curved track
- Noise generated on special trackwork sections, such as at crossovers or turnouts
- Noise generated at grade crossings, including warning bells, horns on the locomotive, or wayside horns

The noise impact analysis for the Sounder Yard Expansion Project considered all project improvements with focus on train storage operations from each of the two turnout locations to the proposed third layover/storage track. All revenue service trips from Seattle to Lakewood (9 daily roundtrips with the future implementation of Easements 1 through 4) and all non-revenue trips between Lakewood and the Sounder Yard were evaluated in previous assessments in the study area (Sound Transit, 2002, 2005, 2009, 2011).

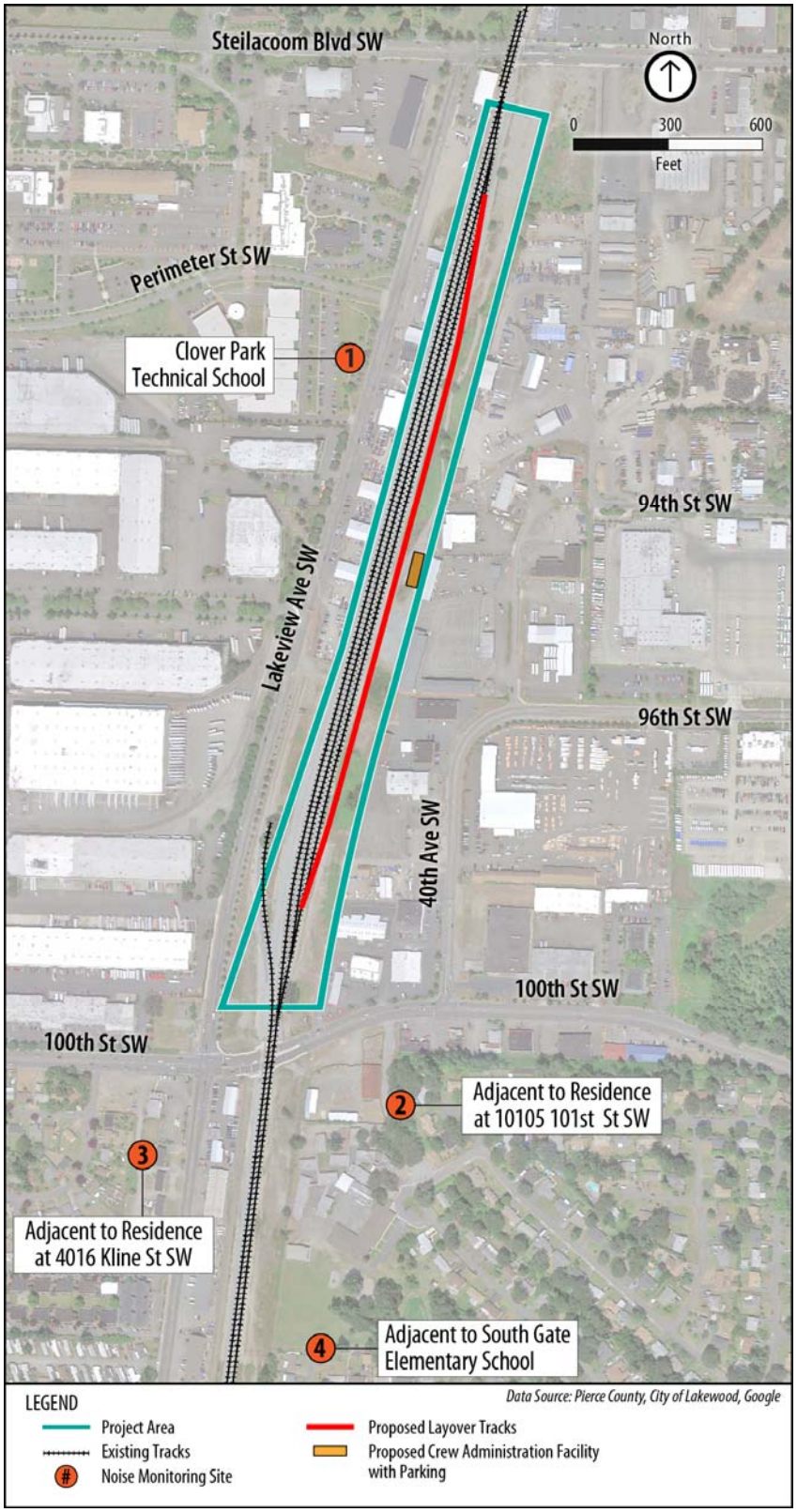
Potentially noise-sensitive land uses and vibration-sensitive buildings were identified by reviewing previous noise and vibration studies that included the Sounder Yard Expansion Project study area. Noise levels were measured at multiple locations near the proposed yardimprovements to establish the existing noise environment (Exhibit 3). All noise measurements followed FTA guidance and were made in accordance with American National Standards Institute (ANSI) procedures for community noise measurements. Larson Davis Model 720 or Model 820 sound level meters were used for all noise measurements.

Predicted future noise levels in the study area are based on measured levels conducted as a part of this study and future daily rail operations (Sound Transit, 2013). To provide a baseline for the analysis of potential noise impacts of the rail operations, long-term (24-hour) measurements were conducted at two residential areas where people normally sleep. Two additional short-term (1-hour) noise measurements were conducted at areas nearby local schools with daytime use only. A 1-hour noise measurement was conducted adjacent to playfields at Southgate School located to the southeast of the Sounder Yard. The second one-hour noise measurement was conducted adjacent to an outdoor use area at Clover Park Technical School. Monitoring locations are shown on Exhibit 3.

Noise resulting from the Sounder Yard Expansion Project includes the prediction of rail storage line and storage yard noise levels over the course of a typical weekday of operation using the FTA spreadsheet model from all individual noise sources. Individual noise sources associated with the project are as follows:

- Daily train storage movements on new layover track that cross the two new turnouts and switches
- Each daily train storage movement includes a locomotive and a specified number of rail cars

Exhibit 3: Noise Monitoring Locations



Noise exposure (future noise that would be generated by the project) was forecast using the FTA 2011 noise model. The FTA model includes default reference noise levels for 23 different noise sources that could be part of a rail project. The default noise reference levels for train types are based on measurements taken from different vehicle types. They are conservative because the reference levels represent the worst-case noise from the vehicle types. The noise model spreadsheet considers the speed of the train, the number of engines and number of cars per train set, and the number of trains per hour during daytime and night-time hours. Other inputs included the type of track, if a track is on aerial structures, if a barrier is present, and if there are buildings between the rail and the receiver. This document uses the default reference noise levels provided by FTA and validates the calculation using reference sound levels from the Sounder commuter rail trains that are expected to use the tracks.

The predicted noise levels are compared to the site-specific criteria to determine if there is "No Impact," a "Moderate Impact," or a "Severe Impact" at each site according to the FTA criteria.

Modeled Project Elements and Assumptions

The current FTA Transit Noise Assessment Spreadsheet Model (HMMH, 2007) was used to calculate noise levels generated by train operations and supporting operations that would occur as a result of the project. Project elements and assumptions used in the FTA spreadsheet model are provided in Exhibit 4.

Exhibit 4: Modeled Project Elements and Assumptions

Project Elements	Assumption
Daily Train Storage Movements (on third layover/storage track only)	Four (two per hour)
Hours of Operation	Two trips between 4 a.m. and 7 a.m. and Two trips between 5 p.m. and 8 p.m.
Average / Maximum Volume (mph)	10
Diesel Electric Locomotives on Fixed Guideway	1
Rail Cars / Train	8
Project Added Turnouts	2
Fixed Guideway	Welded track, at grade, without intervening buildings
Stationary Noise Sources	One layover track, two turnouts

Rail Vibration Assessment Methodology

Vibration impacts from rail operations are generated through the wheel/rail interface. The smoothness of these motions/actions are influenced by wheel and rail roughness, rail vehicle suspension, train speed, track construction (including types of fixation and ballast), the location of switches and crossovers, and the geologic strata (layers of rock and soil) underlying the track. Vibration from a passing train has the potential to move through the geologic strata, resulting in building vibration transferred through the building foundation. The principal concern is annoyance to building occupants.

Vibration impacts expected from the project area were determined using Chapter 10: General Vibration Assessment information and procedures contained in the FTA's guidance manual (FTA, 2006). FTA vibration reference levels for rail vehicles were used to represent the train's force density level function. Transfer mobility functions used to determine ground attenuation were based on vibration reference data. The combination of force density and transfer mobility functions provide an estimate of ground vibration as it relates to distance from the fixed guideway.

The vibration reference levels are based on FTA reference levels, which use base curves that are representative of the upper range of well-maintained North America systems. The vibration model uses the method and formulas in Chapter 10 of the FTA guidance manual to determine if there are possible vibration impacts. The model also considers the speed of the train and distance from the nearest track to the receiver, and then calculates the predicted vibration levels by adjusting the speed and distance of the reference base curves. A number of adjustment factors can be added, including the type of track joint, the type of wheels on the car, the type of track bed, whether special track work is in place, and whether vibration control track treatments are in use. Vibration levels are compared to Table 8-1 in Chapter 8 of the FTA guidance manual to determine possible vibration impacts. Results from this general assessment will provide information to determine the need for and extent of detailed vibration assessment.

Predicted future vibration levels in the study area are based on the previous assessment in the study area (Sound Transit, 2002) which is consistent with the most recent 2006 FTA guidance. No vibration monitoring was performed for this assessment as the survey of nearby land uses did not include any vibration-sensitive uses within 50 feet of the tracks.

Construction Noise and Vibration Methodology

Because the means and methods of construction will not be known until a contractor is selected for the project, the analysis of construction noise and vibration was based on typical activities and equipment used for demolition, excavation, and erection work. Both daytime

and nighttime construction activities were analyzed since it is possible that construction work would occur 24 hours a day.

Construction noise experienced by nearby sensitive receports is qualitatively discussed and evaluated based on EPA estimates of maximum noise levels of typical construction equipment.

Chapter 4—Noise and Vibration Fundamentals and Criteria

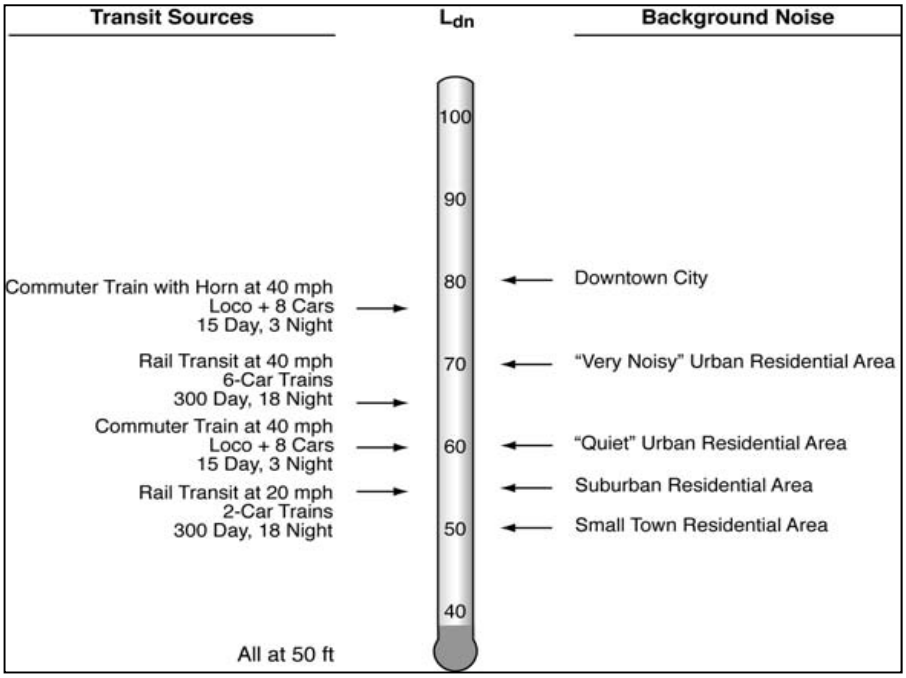
Noise

The basic unit of measurement for noise is the decibel (dB), which is a logarithmic measure of sound energy that tracks closely with human perception of loudness. To better account for human hearing sensitivity to different frequencies contained in sound (or "unwanted sound" called noise), noise is quantified in units of decibels on an "A-weighted scale" (dBA). The "A" scale approximates the average human ear's sensitivity to sounds comprised of many different frequencies. The terms "sound" and "noise" are used interchangeably in this report.

The most commonly used noise metric (also called a "noise descriptor") is the Equivalent Noise Level (L_{eq}), which is the energy sum of all the sound that occurs during a measurement period. Another descriptor known as Average Day-Night Noise Level (L_{dn}), is nearly universally used to evaluate noise in areas with noise-sensitive uses that include sleeping quarters such as residential areas. The L_{dn} is a 24-hour L_{eq} with a 10-dB penalty added to noise occurring from 10 p.m. to 7 a.m. The effect of this penalty is that, in the calculation of L_{dn}, any sound (or noise event) during nighttime hours is equivalent to 10 identical events occurring during daytime hours. This strongly weights L_{dn} toward nighttime noise to reflect that most people are more easily annoyed by noise during nighttime hours when background sounds may be lower and most people are sleeping.

A rural area with no major roads nearby would have a typical L_{dn} of around 40 dBA; a noisy urban residential area close to a major arterial highway would average around 70 dBA L_{dn}. Most residential areas in the study corridor fall within the range of 60 to 75 dBA L_{dn}. Exhibit 5 provides typical L_{dn} values experienced in a range of residential and urban areas.

Exhibit 5: Typical L_{dn} Values



Source: FTA, 2006

Ground-borne Vibration

Ground-borne vibration differs from airborne noise in that it consists of energy transmitted through the earth rather than the air. Ground-borne vibration is not a widespread environmental problem, and is generally limited to localized areas very near roadways, rail systems, construction sites, and some industrial operations. Automobile, bus, and truck traffic rarely create perceptible ground-borne vibration, except where bumps, potholes, or other discontinuities in the roadway surface exist.

When traffic causes phenomena such as rattling windows, the cause is more likely to be acoustic (airborne) excitation rather than ground-borne vibration. The unusual situations where traffic or other existing sources cause intrusive vibration can be an indication of geologic conditions that could also result in higher-than-normal levels of train vibration.

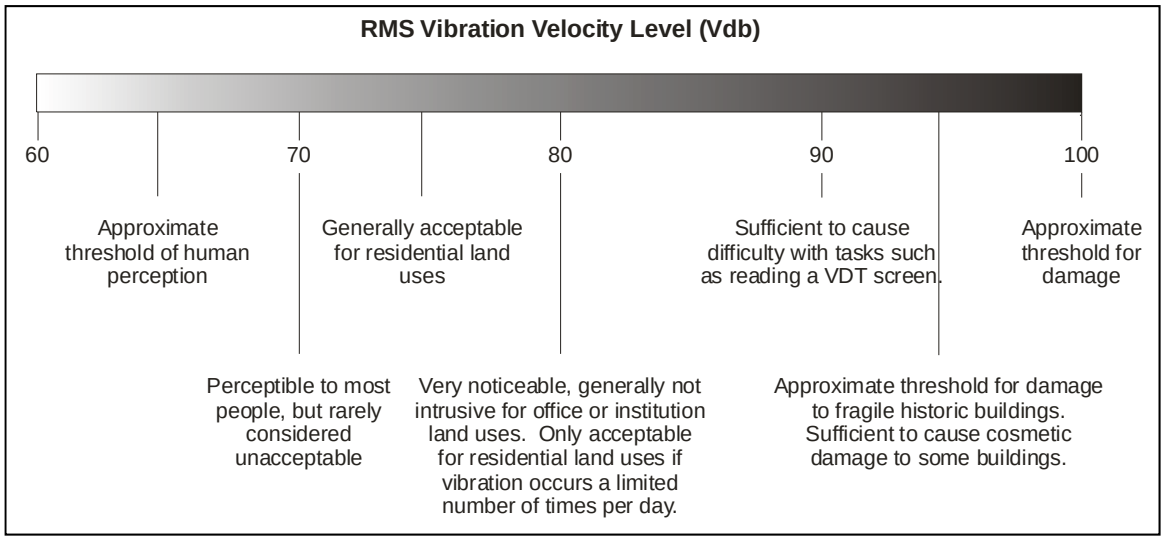
Vibration is an oscillatory (back-and-forth) motion that can be described in terms of the displacement, velocity, or acceleration of the oscillations. Vibration velocity has been standardized as the metric for evaluating environmental vibration effects on humans. Therefore, vibration in this context usually is expressed in units of inches per second (ips). However, because of the very large velocity range over which typical environmental vibration energy can occur (below .001 to above 1.0 ips), a more convenient decibel scale has been adopted that allows for compression of this large range into a more practical scale. The velocity of vibration is expressed in units of decibels relative to 1 micro-inch per second,

and the abbreviation VdB is used for vibration decibels to avoid confusion with sound decibels. The vibration level in most urban areas ranges typically from about 40 to 100 VdB.

Train vibration is almost always characterized in terms of the root-mean-square (RMS) amplitude of the velocity. RMS is a widely used method of characterizing vibration and other oscillating phenomena. It represents the average energy over a short time interval; typically, a one-second interval is used to evaluate human response to vibration. RMS vibration velocity is considered to be the best available measure of potential human annoyance from ground-borne vibration because it is highly correlated with the human body's response to vibration.

Existing background building vibration usually ranges from 40 to 50 VdB, which is well below the range of human perception. Although the perceptibility threshold is about 65 to 70 VdB, human response to vibration is usually not substantial unless the RMS vibration velocity level exceeds 70 VdB (Exhibit 6). This is a typical level of vibration experienced 50 feet from railroad tracks. Buses and trucks rarely create vibration that exceeds 70 VdB, unless there are large bumps or potholes in the road.

Exhibit 6: Typical Levels of Ground-Borne Vibration


RMS Vibration Velocity Level (Vdb)
60
70
80
90
100
Approximate threshold of human perception
Generally acceptable for residential land uses
Sufficient to cause difficulty with tasks such as reading a VDT screen.
Approximate threshold for damage
Perceptible to most people, but rarely considered unacceptable
Very noticeable, generally not intrusive for office or institution land uses. Only acceptable for residential land uses if vibration occurs a limited number of times per day.
Approximate threshold for damage to fragile historic buildings. Sufficient to cause cosmetic damage to some buildings.

Source: FTA, 2006

Impact Criteria

State and Local Regulations (Discussed below)

There are no state or local noise impact criteria in use for operation of the project.

There are several state, county, and local noise regulations and ordinances applicable to construction noise. In general, construction noise is exempt from these standards between 7:00 a.m. and 10:00 p.m.

Federal Noise Impact Criteria

FRA relies upon the FTA noise impact assessment procedures for assessing improvements to conventional passenger rail lines and stationary rail facilities, as well as horn noise assessment (FRA, 2011).

FTA has developed standards and criteria for assessing noise impacts related to transit projects. The standards outlined in the FTA guidance manual *Transit Noise and Vibration Impact Assessment* (FTA, 2006) are based on community reaction to noise.

These standards evaluate changes in existing noise conditions using a sliding scale. The higher the level of existing noise, the less room there is for a project to contribute additional noise.

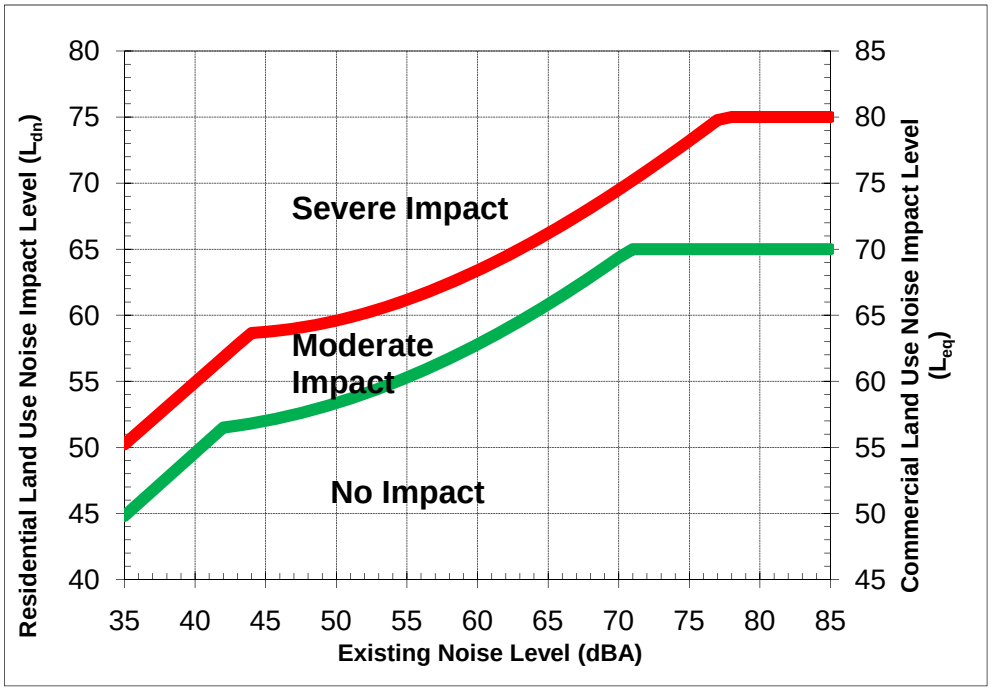
Some land use activities are more sensitive to noise than others; for example, churches, and residences are more noise-sensitive than industrial and commercial areas. The Noise Impact Criteria group sensitive land uses into the following three categories:

- **Category 1**: Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as national historic landmarks with significant outdoor use. Also included are recording studios and concert halls.
- **Category 2**: Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels, where nighttime sensitivity is assumed to be of utmost importance.
- **Category 3:** Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with activities such as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds, and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

L_{dn} is used to characterize noise exposure for residential areas (Category 2), and maximum one-hour L_{eq} (during the period that the facility is in use) is used for other noise-sensitive land uses such as school buildings (Categories 1 and 3).

Exhibit 7 shows the levels of impact included in the noise impact criteria.

Exhibit 7: Noise Impact Criteria for Transit Projects



Source: FTA, 2006

The level of impact also affects potential mitigation requirements for a project. Sound Transit follows this policy for determination of impacts on transit and inter-city rail projects for which it is the local lead agency.

- **Severe Impact**: Project-generated noise can be expected to cause a larger percentage of people to be highly annoyed by the new noise and represents the most compelling need for mitigation. Noise mitigation will normally be incorporated into the project unless there are truly extenuating circumstances that prevent it.

- **Moderate Impact**: Moderate impacts are associated with changes in the cumulative noise level that are noticeable to most people but may not be sufficient to cause strong, adverse reactions from the community. Project noise levels in the Moderate Impact range will also require consideration and adoption of mitigation measures when it is considered reasonable. While impacts in this range are not of the same magnitude as Severe Impacts, there can be circumstances regarding the factors outlined below that make a compelling argument for mitigation. These other factors can include the predicted increase over existing noise levels, the type and number of noise-sensitive land uses affected, existing outdoor/indoor sound insulation, community views, special protection provided by law, and the cost-effectiveness of mitigating noise to more acceptable levels.

Exhibit 8 summarizes the noise impact criteria for commuter and intercity rail operations.

The first column of Exhibit 8 shows the existing noise exposure, and the remaining columns show the level of impact (Moderate Impact or Severe Impact) for future noise exposure. There would be No Impact if noise levels are below the Moderate Impact noise levels. The future noise exposure is the combination of the existing noise exposure and the additional noise exposure caused by the rail project. As the existing noise exposure increases, the amount of the allowable increase in the overall noise exposure caused by the project decreases.

Exhibit 8: Noise Impact Criteria

Existing Noise Exposure Leq or Ldn1	Project Noise Exposure Impact Thresholds: Ldn or Leq1 (all noise levels in dBA)			
	Category 1 or 2 Sites		Category 3 Sites	
	Moderate Impact	Severe Impact	Moderate Impact	Severe Impact
<43	Amb.+10	Amb.+15	Amb.+15	Amb.+20
43-44	52	58	57	63
45	52	58	57	63
46-47	53	59	58	64
48	53	59	58	64
49-50	54	59	59	64
51	54	60	59	65
52-53	55	60	60	65
54	55	61	50	66
55	56	61	61	66
56	56	62	61	67
57-58	57	62	62	67
59-60	58	63	63	68
61-62	59	64	64	69
63	60	65	65	70
64	61	65	66	70
65	61	66	66	71
66	62	67	67	72
67	63	67	68	72
68	63	68	68	73
69	64	69	70	74
70	65	69	70	74
71	66	70	71	75
72-73	66	71	71	76
74	66	72	71	77
75	66	73	71	78
76-77	66	74	71	79
>77	66	75	71	80

Source: FTA, 2006

[1]Ldn is used for land uses where nighttime sensitivity is a factor; Daytime Leq is used for land uses involving only daytime activities.

Category Definitions:

Category 1: Buildings or parks where quiet is an essential element of their purpose.

Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.

Category 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches.

For example, Exhibits 9 and 10 show the impact levels for future noise exposure if the existing noise exposure is 53 dBA. As shown, for residential land use (Category 1 or 2), a Moderate Impact would occur at 55 dBA and a Severe Impact would occur at 60 dBA. For commercial land use (Category 3) a Moderate Impact would occur at 60 dBA and a Severe Impact would occur at 65 dBA.

Exhibit 9: Example Impact Levels with an Existing Noise Exposure Level of 53 dBA

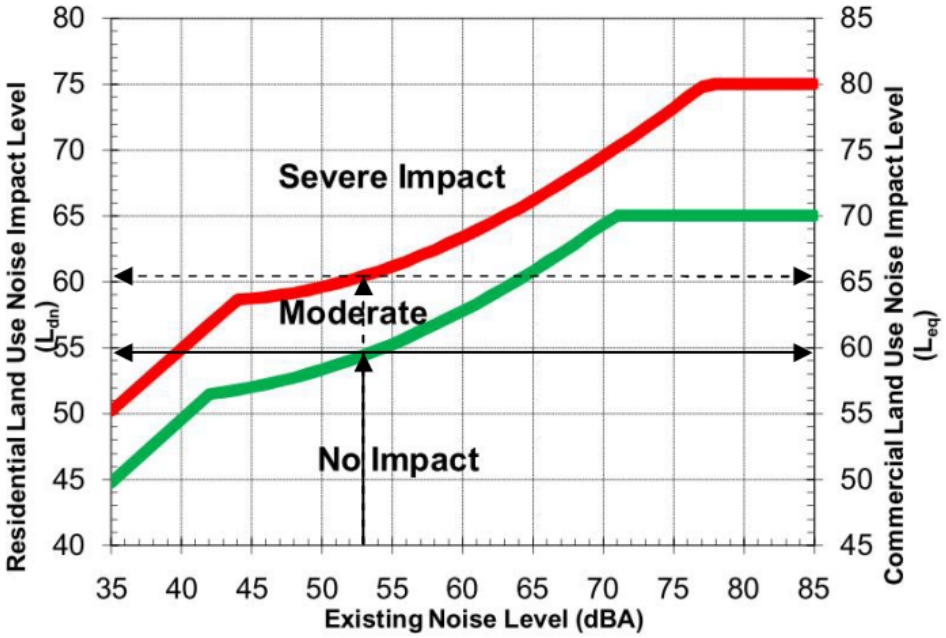
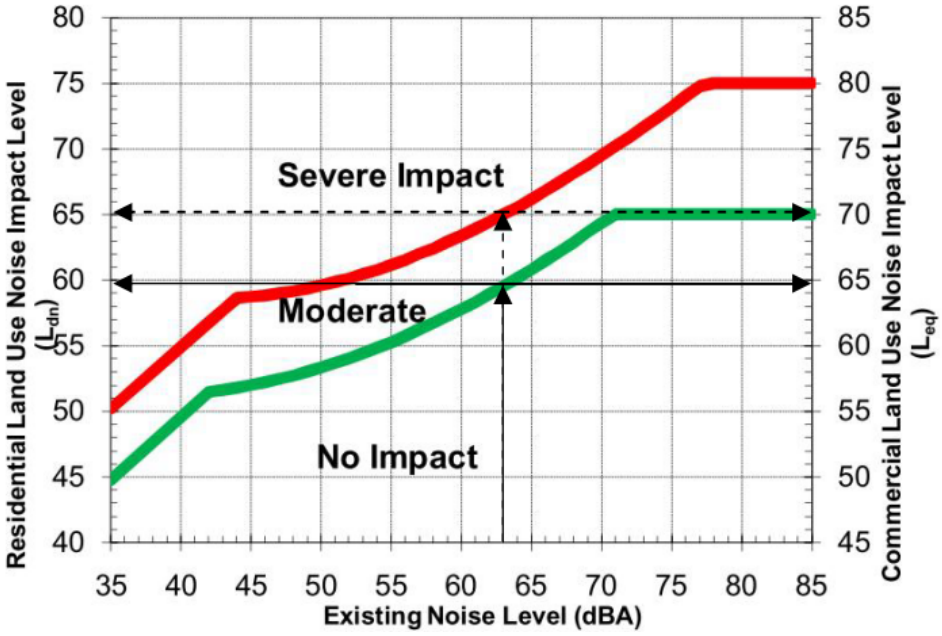


Exhibit 10: Example Impact Levels with an Existing Noise Exposure Level of 63 dBA



State of Washington Noise Criteria

Along with local noise ordinances, the Washington State Noise Control Ordinance (WAC 173-60) applies to general construction activities, park-and-ride lots, and maintenance facilities and maintenance activities planned as part of the project. WAC 173-60 does not contain guidance or restrictions on highways or commuter rail noise, which are considered exempt uses along with many other public facilities operating in public rights-of-way.

City of Lakewood Noise Limits

The City of Lakewood limits sounds originating from construction sites, including, but not limited to, sounds from construction equipment, power tools, and hammering between the hours of 10 p.m. and 7 a.m. on weekdays and 10 p.m. to 9 a.m. on weekends (Lakewood Municipal Code 08.36.010—Noise Control). Construction activities during nighttime hours that would exceed these levels require a noise variance from the City of Lakewood.

Federal Vibration Impact Criteria

FRA relies upon the FTA vibration impact assessment procedures for assessing improvements to conventional passenger rail lines and stationary rail facilities (FRA, 2011). FTA has developed impact criteria for acceptable levels of ground-borne noise and vibration (FTA, 2006).

Ground-borne vibration from rail vehicles is characterized in terms of the RMS vibration velocity amplitude, which is a good indicator for the potential for human disturbance. A one-second RMS time constant is assumed. This is in contrast to vibration from blasting and other construction procedures that could cause building damage. When assessing the potential for building damage, ground-borne vibration is usually expressed in terms of the peak particle velocity.

The threshold of vibration perception for most humans is around 65 to70 VdB; levels from 70 to 75 VdB are often noticeable but acceptable; and levels greater than 80 VdB are usually considered unacceptable.

For human annoyance, there is a relationship between the number of events and the degree of annoyance caused by the vibration. It is intuitive to expect that more frequent or longer duration vibration events are more annoying to building occupants. To account for the fact that most commuter rail systems have fewer daily operations than the typical urban transit line, the criteria in *Transit Noise and Vibration Assessment* (FTA, 2006) include an 8-VdB higher impact threshold if there are fewer than 30 events of the same source type per day, regardless of the number of cars per train. Thus, for rail systems with fewer than 30 trains per day, the limit for an acceptable level of residential ground-borne vibration is 80 VdB.

Ground-borne vibration from any type of train operation will rarely be high enough to cause building damage, even minor cosmetic damage. The only real concern is that the vibration will be intrusive to building occupants or interfere with vibration-sensitive equipment.

The vibration of floors and walls may cause a rumble noise within a building. This rumble is the noise radiated from the motion of the room surfaces. In essence, the room surfaces act like a giant loudspeaker. This is called ground-borne noise. Ground-borne noise could result in an impact for underground rail operations. It is not considered for at-grade or above-ground rail operations because the level of airborne noise transmitted through windows or walls would exceed the ground-borne levels.

Exhibit 13 summarizes the impact criteria for ground-borne vibration. These criteria are based on previous standards, criteria, and design goals, including the ANSI S3.29 (Acoustical Society of America, 1983) and the noise and vibration guidelines of the American Public Transit Association (APTA, 1981). Some buildings, such as concert halls, television and recording studios, and theaters, can be very sensitive to vibration but do not fit into any of the three categories. Because of the sensitivity of these buildings, they usually warrant special attention during the environmental review of a transit project.

Exhibit 13: Ground-Borne Vibration Impact Criteria

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re: 1 micro-inch/sec)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where low ambient vibration is essential for interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

Source: FTA, 2006

[1] "Frequent Events" are defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
[2] "Occasional Events" are defined as between 30 and 70 vibration events of the same sources per day. Most commuter trunk lines have this many operations.
[3] "Infrequent Events" are defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.
[4] This criterion is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research uses will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC system and stiffened floors.

Chapter 5—Affected Environment

Noise

Potentially noise-sensitive land uses and vibration-sensitive buildings were identified by reviewing previous noise and vibration studies that included the Sounder Yard Expansion Project study area. Noise measurements and calculated sound levels using the FTA model were performed for the Sounder Yard Expansion Project and were used to provide a baseline for the analysis of potential noise impacts of the project improvements. Predicted future noise levels in the study area are based on measured and calculated sound levels and future daily rail operations.

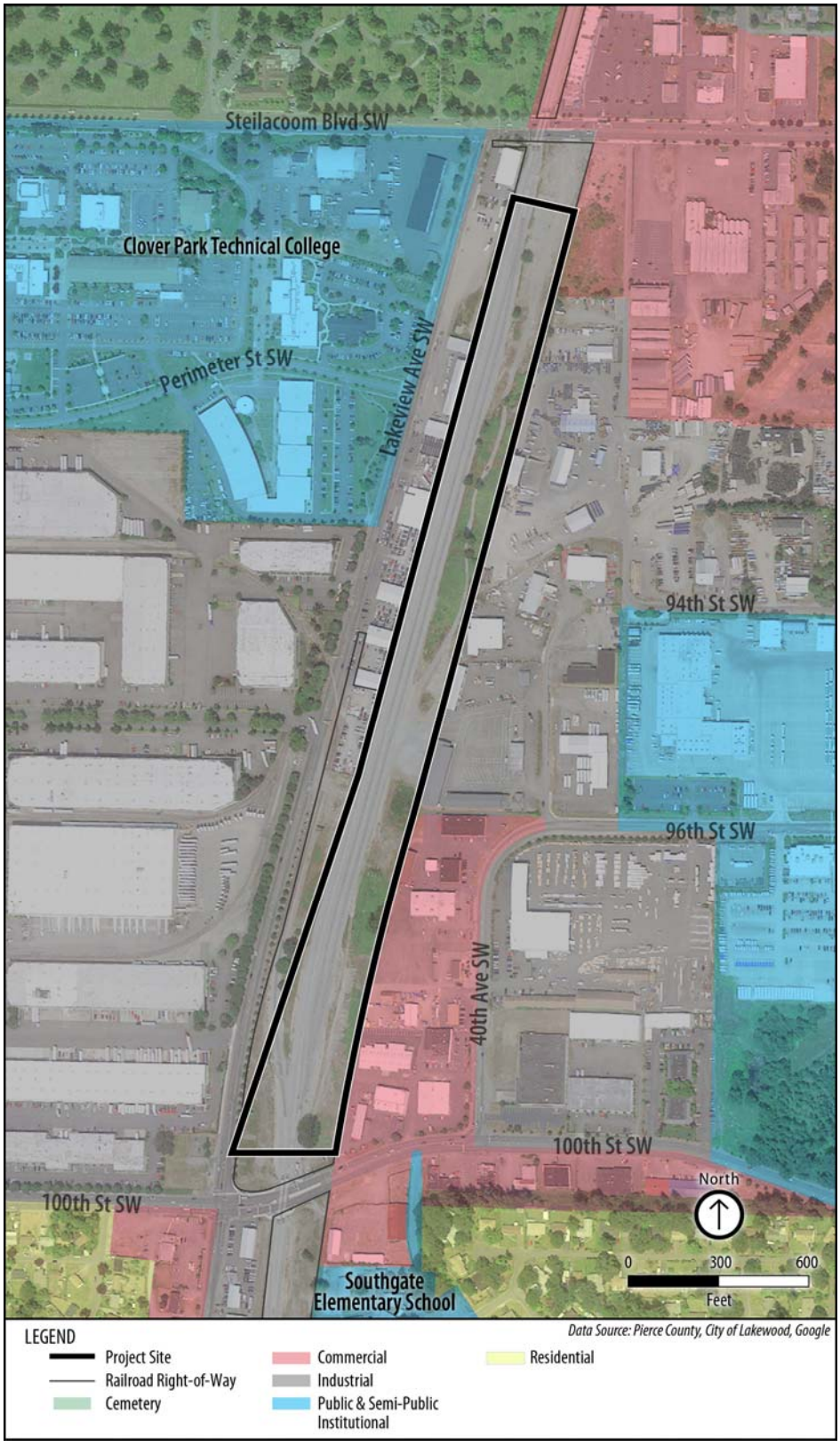
The project study area is primarily characterized by adjacent industrial and commercial land uses along with residential and institutional land farther from the project site (Exhibit 14). As shown on Exhibit 14, residences (a FTA Category 2 land use as described in Chapter 4) are located to the south of the project area, south of 100th Street SW and to the east and west of Lakeview Avenue SW. Southgate Elementary School is also located south of the project area and south of 100th Street SW. Clover Park Technical College is located to the west of the project site and Mountain View Memorial Cemetery Park is located to the northwest. The primary daytime uses at both of the schools and the cemetery are included in FTA Category 3 land uses. The measurement and modeling locations include the residences closest to the Sounder Yard and the nearest noise sensitive outdoor uses at Southgate Elementary School and Clover Park Technical College.

The project would use an existing Sound Transit rail corridor currently in use. Ambient conditions in the project area are characteristic of an urban area with nearby train service, local roadway noise, and aircraft noise from nearby Joint Base Lewis-McCord.

Vibration

Predicted future vibration levels in the study area are based on the previous assessment in the study area (Sound Transit, 2002). Vibration resulting from the Sounder Yard Expansion Project was determined using Chapter 10: General Vibration Assessment information and procedures contained in the FTA's guidance manual. The survey of nearby land uses did not include any vibration-sensitive uses within 50 feet of the tracks.

Exhibit 14: Land Use Map



Chapter 6—Project Impacts

Noise

Noise exposure levels (the noise level that would be generated by the project, not including other noise sources) were predicted for the three modeled locations. As a result of the project, future noise levels are predicted to result in no change to 1 dBA L_{dn} increase in existing noise levels at residences south of 100th Street SW and. The proposed project is predicted to result in no change in noise levels at Southgate Elementary School and an increase of 2 dBA L_{dn} at Clover Park Technical School. Noise level increases would occur between 4 a.m. and 7 a.m. and between 5 p.m. and 8 p.m. based on the operation schedule.

When calculating the sound exposure level for a 24-hour day for residences or other land uses that include 24-hour use, the L_{eq} from 7 a.m. to 10 p.m. is added to 10 times the SEL from 10 p.m. to 7 a.m.

Because multiple transportation-related noise sources and other urban noise sources already exist in the project area, the addition of project improvements would result in minor increases in noise levels at all noise-sensitive locations. Noise exposure from the project would range between 45 and 58 dBA L_{dn}/ L_{eq} at the modeled noise-sensitive land uses (Exhibit 15).

Exhibit 15: Calculated Sound Levels of Project-Related Noise (dBA)

Site # / Name	FTA Land Use Category [1]	Measured Noise Levels 2013[2] (Existing[3]) Ldn/Leq[4]	FTA Thresholds for Moderate/ Severe Impact	Sounder Yard Expansion Project Noise Exposure Ldn/Leq[5]	Future/ Total Noise Exposure Ldn/Leq[5]	Calculated Total Noise Increase	FTA Impact with Project? (Moderate or Severe)
Site 1: Clover Park Technical College	3	60	63-68/ >68	58	62	2	None
Site 2: Residences at 101st Street SW	2	55	56-61/ >61	47	56	1	None
Site 3: Residences at Kline Street SW	2	62	59-64/ >64	45	62	0	None
Site 4: South Gate Elementary School	3	60	63-68/ >68	50	60	0	None

[1] FTA Land Use Categories are described in Chapter 4.
[2] Measured noise levels were collected as part of the Sounder Yard Expansion Project Sound Transit, 2013).
[3] Existing L_{dn} is reported for residential areas; L_{eq} is reported for other noise-sensitive areas.
[4] FTA Noise Impact Criteria are L_{dn} or L_{eq} values as appropriate, calculated from Exhibit 7 in Chapter 4.
[5] Future noise exposure includes noise from the increased future transit noise associated with project operations; non-project-related noise sources are not included.

As shown in Exhibit 15, project-related noise levels are projected to contribute less noise than measured existing noise levels. Project-related noise levels are below FTA Noise Impact Criteria at all four modeling locations closest to the project site and its related noise sources. Noise impacts under the FTA criteria are not predicted to occur at the four locations evaluated for the Sounder Yard Expansion Project. Because the project would cause minor increases in average noise levels, there may be an increase in the frequency of noise peaks caused by train operations and project-related facilities at the project site. The highest noise levels associated with this project would occur between 4 a.m. and 7 a.m. or between 5 p.m. and 8 p.m. at Site 1 at Clover Park Technical College, located east of Lakeview Ave SW, because of Sounder operation schedule and this site's relative distance to the project improvements.

Future total noise levels near the project site, which include existing train operations and other background noise sources, are predicted to remain near the existing noise levels from 55 to 62 dBA L_{dn} at the nearest residential locations and from 60 to 62 dBA L_{eq} at the two schools, assuming the project would be the only change to the local noise environment. These noise levels represent a range of future noise levels from no increase over existing noise levels to an increase of 0 to 2 dBA L_{dn}/L_{eq}.

Wheel squeal is another potential noise source. Wheel squeal is caused when wheels slip or stick to rails as vehicles negotiate tight radius curves. The low train speed (10 mph or less) and turning radii for train movements entering and exiting the third layover/storage track (1,011 feet, greater than FTA recommended 1,000 feet to avoid wheel squeal) would limit the occurrence of wheel squeal at the project site.

Vibration

Vibration resulting from the proposed third layover/storage track, parking lot, and related project facilities were determined using Chapter 10: General Vibration Assessment information and procedures contained in the FTA's guidance manual. Considering all intervening building rows with the location of proposed project improvements, vibration impacts would only occur if vibration-sensitive land uses are located in the immediate vicinity of the project. Because trains operating on the proposed third layover/storage track would operate at low speeds (10 mph), vibration levels are expected to be below 70 VdB at 50 feet from the tracks. The survey of nearby land uses did not include any vibration-sensitive uses within 50 feet of the tracks. A warehouse/garage located along 39th Avenue Court SW is the nearest structure to the proposed third layover/storage track at approximately 100 feet away. The same warehouse/garage is the located closest to the nearest project facility, at approximately 30 feet from a proposed concrete pad and crew

trailer facility. Therefore, no substantial vibration impacts are predicted to occur as a result of operation of this project.

Construction

Nearby receptors would experience temporary noise impacts during project construction. No vibration impacts are expected.

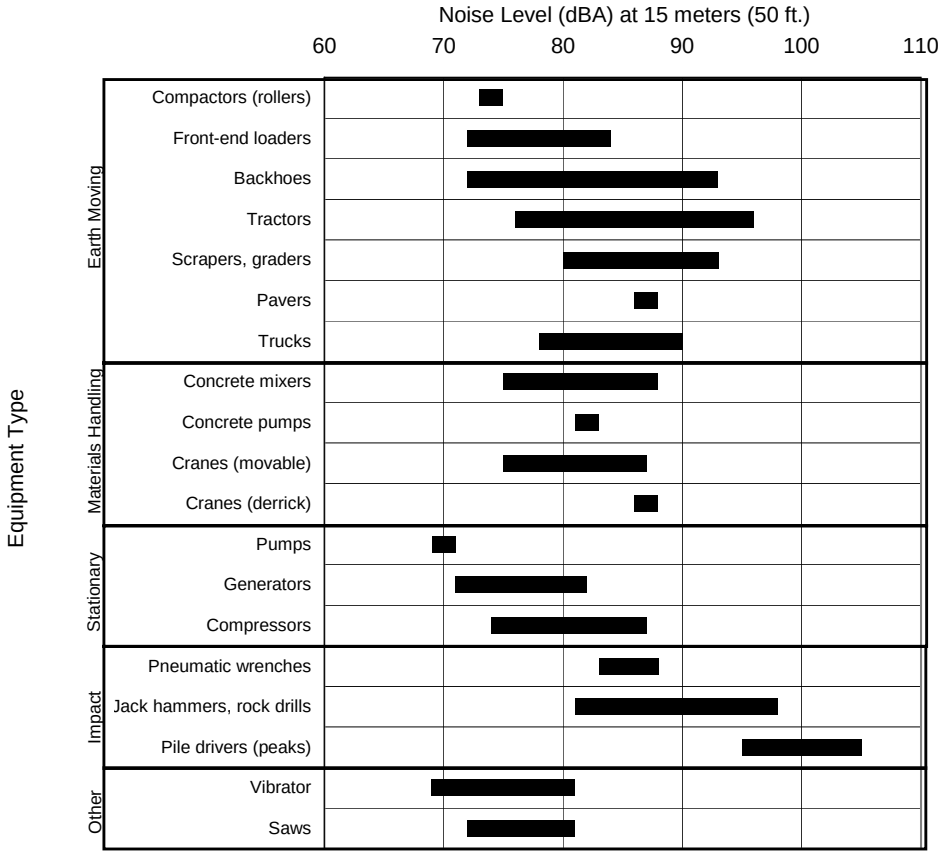
Noise

Noise during the construction period could be bothersome to nearby residences. Construction workers would also be subject to construction noise while working on the site. Construction would be carried out in several discrete steps, each with its own mix of equipment and, consequently, its own noise characteristics. Railroad and access road construction would involve clearing, cut-and-fill activities, placing ballast, and installing new track or retrofitting existing track and paving. For the project, the highest construction noise levels would likely be associated with earthmoving typically associated with track and roadway construction. Construction noise is temporary and would vary widely both spatially and time-wise over the course of the project's construction.

The most prevalent noise source at project construction sites would be internal combustion engines. Earth-moving equipment, material-handling equipment, and stationary equipment are all engine-powered. Mobile equipment operates in a cyclical fashion, but stationary equipment (e.g., generators and compressors) operates at sound levels that are fairly constant over time. Because trucks would be present during most construction phases and would not be confined to the project site, noise from trucks could affect more receptors.

Construction noise would be intermittent, occurring at various locations on the project site. Construction noise levels would depend on the type, amount, and location of construction activities. The type of construction methods would establish the maximum noise levels of construction equipment used. The location of construction equipment relative to adjacent properties would determine any effects of distance in reducing construction noise levels. The maximum noise levels of construction equipment under the project would be similar to the typical maximum construction equipment noise levels presented in Exhibit 16.

Exhibit 16: Construction Noise Levels



Source: EPA, 1971; WSDOT, 1991

As shown in Exhibit 16, maximum noise levels (L_{max}) from construction equipment would range from 69 to 93 dBA at 50 feet. The closest noise sensitive receiver to project construction is Clover Park Technical School. Construction noise at residences farther away would decrease at a rate of 6 to 8 dBA per doubling of distance from the source. Outdoor areas at the Clover Park are estimated to experience temporary maximum construction equipment noise from the 50's dBA to 80's dBA depending on the types of equipment in use. Because various pieces of equipment would be turned off, idling, or operating at less than full power at any given time and because construction machinery is typically used to complete short-term tasks at any given location, average L_{eq} daytime noise levels would be less than the maximum noise levels presented in Exhibit 16.

Construction noise is exempt from local property line regulations during daytime hours. Construction noise levels could be reduced by the construction practices identified in Chapter 7.

Vibration

Common vibration-producing equipment used during above-ground construction activities includes bulldozers, backhoes, and ballast tampers. Pavement breaking and soil compaction would probably produce the highest levels of vibration. Exhibit 17 shows types of construction equipment measured under a variety of construction activities, and includes an average of source levels reported in terms of velocity levels. Although the exhibit lists one velocity level for each piece of equipment, considerable variation exists in reported ground-vibration levels from construction activities. The data provide a reasonable estimate for a wide range of soil conditions.

Vibration is usually measured as a root-mean-square velocity level L_v, which is reported in velocity decibels (VdB) referenced to a vibration level of 1 micro inch/second. Humans can perceive vibration levels above approximately 65 VdB. Heavy construction equipment such as large bulldozers and loaded trucks frequently generate between 85 and 87 VdB at 25 feet. The threshold for minor damage to fragile buildings is approximately 100 VdB. Buses and trucks frequently generate approximately 65 VdB at 25 feet. No potentially fragile buildings are located within 25 feet of proposed construction activities; therefore, no vibration damage is expected to buildings during construction.

Exhibit 17: Vibration Source Levels for Construction Equipment

Equipment		Peak Particle Velocity at 25 feet (in/sec)	Approximate Lv at 25 feet (VdB)
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: FTA, 2006

Lv = RMS velocity in decibels (VdB) re 1 micro-inch/sec
RMS = The square root of the mean-square value of an oscillation waveform.

Limits on construction activities discussed in Chapter 7 would minimize the risk of vibration damage during construction.

Chapter 7—Mitigation

Operation

Noise

No mitigation measures are proposed because no impacts or severe impacts would be created by the project. Noise exposure levels (the noise level that would be generated by the project, not including other noise sources) were predicted to be equal to or within 2 dBA L_{eq} /L_{dn} of existing noise levels.

Vibration

No mitigation is proposed because no impacts are expected.

Construction

Noise

Noise-control measures during construction would be required to minimize noise levels on existing noise-sensitive land uses. All construction activities would have to comply with local noise regulations. Nighttime work (10:00 p.m. to 7:00 a.m. weekdays and 10:00 p.m. to 9:00 a.m. weekends) could require a variance for local noise regulations.

The noise-control measures listed in this section are examples of those that could be incorporated into the project's construction phase. The contractor would be required to comply with any noise regulation permits acquired for the project. Construction hours could be set, and construction activity noise level emission criteria could be determined and compliance required during construction.

During the early stages of construction plan development, natural and artificial barriers (e.g., ground elevation changes and existing buildings) could be considered for use as shielding against construction noise. Strategic placement of stationary equipment, such as compressors and generators, could reduce impacts at sensitive receivers.

The contractor would comply with standard specifications and all local sound control and noise level rules, regulations, and ordinances that apply to any work performed pursuant to the contract. Each internal combustion engine used on the project would be equipped with a muffler of a type recommended by the manufacturer.

Noisier activities involving large machinery would be limited to daytime hours as practical. Nighttime construction would require a variance. Compliance with local noise ordinances would mitigate impacts associated with construction noise. To comply with these

ordinances, all construction activities adjacent to residential uses could be limited to daytime hours (7:00 a.m. to 10:00 p.m.) Monday through Friday and (9:00 a.m. to 10:00 p.m.) on weekends unless a variance is obtained.

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